# N.A.C.A. BULLETIN

*June*
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N.A.C.A. BULLETIN

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# Distribution of National and Divisional Overheads

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*Capacity is the general basis for the home office, sales and divisional overhead distributions described in this article reflecting the situation of a nonferrous metal processor and fabricator. The article tells how capacity determinations were made and how overhead application bases were derived from them or exceptions made where necessary.*

THE DISTRIBUTION TO DIVISIONS in a large multi-plant company of home office overheads and the cost of a nationwide sales organization and their subsequent redistribution to various production departments within these divisions, has presented a difficult and perplexing problem. Although cost accounting texts deal with various aspects of internal plant distributions, industrial accounting literature has paid little attention to distribution bases of the classes of overhead which will be outlined in this paper.

## Overhead Pools and Previous Distribution Basis

The American Brass Company, a subsidiary of The Anaconda Company, operates eight heavy mills for the production of copper and copper-base alloy sheet, tube, rod, extruded shapes, wire forgings, and aluminum coiled sheet. At the present time two new mills are under construction. One of these mills will be for the production of copper and brass products and the other is an aluminum mill for the production of aluminum sheet, strip, rod, tube and extrusions. In addition, the company operates three factory divisions. Two of these divisions fabricate flexible metal hose and other allied products, from a

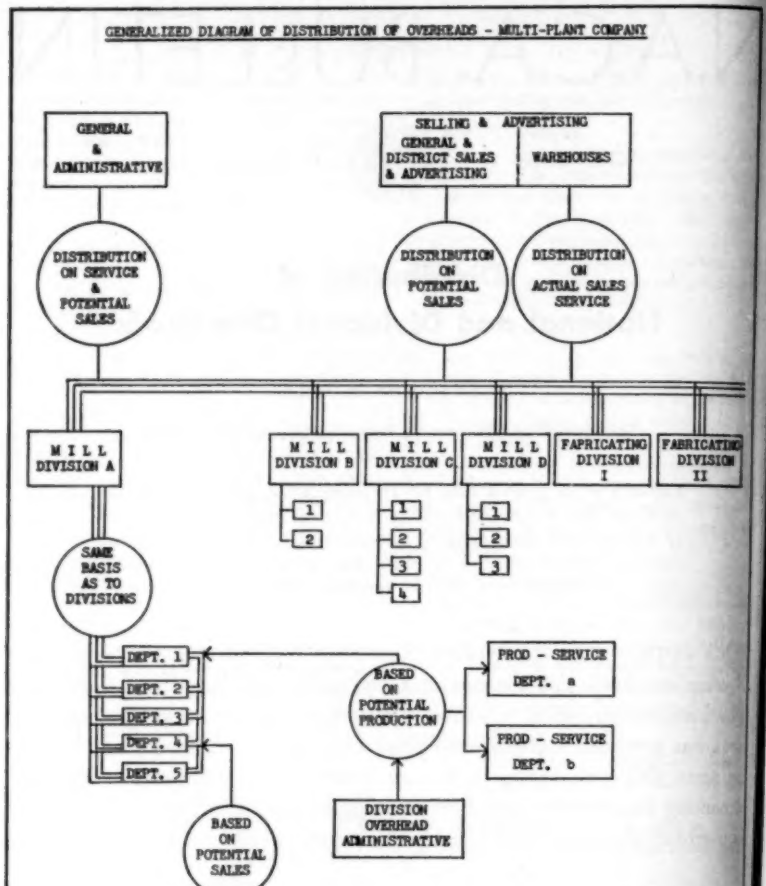


**EXHIBIT 1**

variety of materials. The other factory division fabricates hundreds of different types and sizes of eyelets, radio pins, screw shells and other metal products formed on multiple plunger presses.

This paper will outline the procedures developed by this company for the

distribution of general overheads to divisions and departments on a capacity basis. However, we believe it would be helpful to outline briefly the classes or overhead pools with which we are concerned and the former bases used for distribution. The following overhead pools are involved:

1. *Home office general and administrative expense*—Specialized services for selected divisions and general services to all divisions. Consists principally of salaries, travel and operating expenses of such functions as partly centralized accounts receivable, traffic and laboratory services; and general research, accounting, production, purchasing and executive services.

2. *Home office selling and advertising expense, and national sales & distribution expense*—Central sales, advertising, and sales service/promotion; national district sales offices; warehouse distribution channels. In general these functions serve all mills and products.

3. *Division manufacturing overhead*—Division executives, production and administrative organization. Includes accounting, cost accounting, incentives and methods, personnel, engineering, order, invoice, and office management, etc. Also includes expenses not directly assignable to production or service departments, such as taxes, insurance, stationery, operating supplies, financial income and expense, etc.

4. *Division selling and advertising overhead*—Division local sales organization, including sales manager, assistants, sales representatives, correspondents, etc. Also includes other selling expenses such as commissions, local advertising, travel, telephone, etc.

Exhibit 1 illustrates the flow of the distributions of Items 1 and 2 to divisions and the further redistribution to producing departments. The chart also illustrates the distributions for Items 3 and 4 to producing and production-service departments.

Until two years ago, the pools described with the exception of the first (which had been distributed on a fixed basis for a number of years) were distributed to divisions and departments monthly based on actual production labor or actual sales dollars, depending on whether administrative or selling overhead was involved. Home office selling and advertising expense was allocated monthly to divisions (and producing departments) on the basis of sales for the month. Division manufacturing overhead and home office general and administrative expense allocated to the divisions, were charged to departments on the basis of monthly sales. Although these methods had been used for a long period of time, a survey performed about four years ago served to emphasize the serious limitations of continuing them.

As in other heavy industries, the copper and brass fabricating business is subject to variations in production activity. These variations are, at times, significant and usually affect one or more major classes of product, such as sheet, rod or tube. Variable distribution procedures, because of the relatively fixed nature of the expenses involved, resulted in distortions to product cost and other operating statements. High production levels resulted in high total and unit fixed costs and low production levels resulted in low total and unit fixed

costs for producing departments. Cost control efforts were often misdirected. These problems were definite factors which dictated the consideration of a method of distribution on some other basis.

Proponents of direct costs could interject here, "We told you so. . . . You shouldn't allocate fixed costs at all." However, it has been our policy to regularly segregate fixed and variable costs. The advantages of having this information available are well known to us. In many cases we have made use of direct costs. But it is our opinion that we normally obtain a better picture by having full costs to complete the information for all management purposes. We feel that this gives us an advantage in cost analysis and in determining operating potentials.

### *Finding a Practical and Logical Distribution Basis*

But what should we do? Undoubtedly the most desirable basis on which to allocate overhead is one of services rendered. An advocate of this method of overhead distribution is Mr. R. S. Makepeace in an article in the September 1956 N.A.C.A. Bulletin entitled "Distribution of Selling and General Overhead." We agree with the theoretical idea of distribution based on service rendered. However, it is difficult or cumbersome to measure services, especially in a multi-plant company. Where such services can be measured directly, there is no great problem. In our case, we can do this for certain centralized clerical functions such as accounts receivable. Most of the property and payroll taxes in divisional overheads can usually be directly distributed on a fairly logical basis. But a large part of the overhead costs are individual salaries. These are not so easily distributed on services rendered. It is our experience that personnel providing these services too often have their viewpoints colored by the immediate problems which confront them. In many cases, it is not feasible to trace service rendered, due to remoteness as well as subjectivity of the current opinion. When we get to such things as top executive service, research, financial planning and so on, we feel that it is practically impossible to use a services rendered basis. However, we have used this as a basis for distributing a part of our home office and divisional overheads as will be described in more detail.

Of course, we are in business to make and sell our products. Our certificate of incorporation states the general purpose of the company. In our case, this happens to be to manufacture brass, copper, and metals of all kinds, and all kinds of articles composed wholly or in part of brass or other metals or materials. In addition we have a general purpose of buying, selling, or dealing in such other property as may be deemed advisable. In general economic terms,

our purpose is to take raw materials, human labor, and supplies, and convert them into useful economic articles at a profit. This is similar to the value added theory used in the Census of Manufacturers and other government reports. If this is to be recognized as the purpose of the company, it seems logical to consider it also the purpose of the overhead organization.

Overhead cost indirectly or eventually contributes to accomplishing the corporate goal. Accordingly, we felt that, if we could measure the capacity for producing and selling our products, this should be a reasonable basis for distribution of those services equally attributable to corporate purposes generally. We had previously investigated our capacity for production in connection with operating studies, such as a percentage of capacity for break-even operations and so on. This was useful in determining operating situations by division, product line, etc., and to make comparisons to trend. So we had some background on the approach to measuring capacity. The general idea of a capacity basis for overhead distribution was discussed with sales and production executives. To our surprise the sales executives, particularly, were interested in utilizing this method. Most of these men felt that this kind of distribution would eliminate the distortion in final earnings which was resulting from the variable distribution procedure.

### *Preliminary Problems of Capacity Measurement*

Our products are not all the same nor are they priced the same. We consider that our business is a custom-made proposition because its products may be infinite varieties of metal mixtures, widths, gauges, lengths, and other dimensions. In addition, the final finish, form, and temper may vary each time a similar product is made. We do have a good percentage of repeat business but the items which repeat will change over a period of time as our customers' fabricating facilities change. This results in continuous change in our product mix and sales pattern. Our fabricating divisions, especially, have a rapid turnover in their products. In many cases the products now made were not even engineered five years ago. These divisions, being closer to the end use of their material, have had to redesign and develop products as consumers' technology has changed. Another complicating factor is that, in general, we have had some excess capacity for certain items and even product lines. But to a large extent our products can be termed fungible goods, particularly in terms of tonnage, and this does help to reduce the problem of capacity determination for particular sizes, shapes and forms.

Potential capacity determination requires definitions as to production compo-

sition, the type of shipments includable, and mill operating schedules. Product composition for this purpose was based on peacetime sales mixtures and excluded war products not consumed in normal times and produced in emergency quantities. Potential shipments to be included were those to customers and distributors or distribution channels. Excluded were interdepartment and intermill transfers of semi-finished material. Mill operating schedules were based on 5-day weeks, 21-day months, or 252 working days in the year. In addition to all normal operating and mechanical delays, an extra 10 per cent was deducted from calculated production capacity to provide for usual breakdowns and for any bias which may be introduced due to favorable conditions of product mix and other factors during the period in which the survey was made. In general, production was calculated on a normal shift basis, with equipment, manpower, and commercial considerations determining in the operation of each department.

There were many special considerations. The commercial limitations on capacity were very difficult to assess. We felt that the potential capacity figure must be limited to commercially salable material. In some cases, our equipment has a greater capacity than the commercial demand. In other cases, our equipment may have a large capacity but can not produce in quantity to the required commercial tolerances. We did not limit capacity for the factor of raw material availability, but this was considered a limiting factor in our overall potential. Manpower limitations were critical in some areas, particularly in obtaining personnel for second and third shift operations. In many cases, there were bottleneck machine areas which were determining factors in total capacity. The value of our fabricating output is not only dependent on machine operations but on selection of product as well. Cost and, therefore, eventually sales depend on volume because of the high proportion of set-up time. Engineering of tools may be a limiting factor but, to some extent, these can be purchased.

### *Determination of Physical and Weighted Capacity*

As was mentioned previously, we had a continuing interest in our estimated capacity for other purposes. In establishing the potential capacity for our tonnage mills, operational records were reviewed for the 4 post war years. As a starting point we selected three or four months with the highest shipment poundage for each department. These departments are more or less homogeneous in their production of a product line such as sheet, rod, tube, and so on. Practically every machine in each department has a machine record which is used as a basis for incentive calculation, machine efficiency and other production purposes. Each of these machine records was reviewed for the high poundage

months. The record showed the days run, shift hours, man hours, delay time, and appropriate unit production statistics.

The review was made by a central production department staff member who was a specialist in the manufacture of the particular product. Usually this engineer could determine whether the machine operation as recorded was typical for normal efficiency. From his analysis and after giving proper consideration to bottleneck operations, shift time, delay time, and similar matters, an initial potential capacity resulted. These department capacities were then reduced to a uniform 21-day month and normal shift bases. The capacities so determined, and certain underlying procedures or statistics, were reviewed by the home office executives in charge of production. At this point we discovered that, although the potential capacity was reasonably correct as determined, it was not salable in some cases, due to equipment limitations in meeting commercial requirements. Accordingly, the tonnage potentials were then reviewed with the sales executives. Commercial limitations were considered as a limiting factor where the equipment could considerably out-produce demand or where demand required tolerances the equipment could not handle. These capacities were also reviewed by our financial administrative executives. Their reasonableness was verified with actual statistics on sales, production, and so on.

The capacity problem was considerably different for our fabricating divisons. Fortunately, here again we had machine records covering production. We also had the details of sales by product lines broken down into a sufficient number of categories to assist in the determination of capacity. In the case of one division, there were basic operations which were limiting factors to production. These were certain machine groups which acted as feeder groups to the rest of the production machinery. In this case, the division works manager was able to determine production capacity figures from the available information. In addition, he knew that his equipment, the staff of engineers who design products, and the trained work force, would be able to produce a certain aggregate economic value in a given period of time and under certain conditions. As with tonnage mill determinations, this potential was reviewed by the division sales personnel to make sure that it was reasonable. In the case of another fabricating division, we had a great deal of trouble in determining the potential. We were more or less limited to developing dollar value of sales, determined from a review of a selected base period. However, the final capacity settled upon was largely worked up by the production people and approved by sales personnel.

All of these capacities are reviewed annually because change in equipment and modernization of our mills results in different potentials. On occasion, we have had to supply outside agencies with figures for production potential and

our executives have used as a basis the work done on capacity as estimated from this procedure.

But there was another step to be taken. In determining the potential of our tonnage departments we had built up a quantity figure in pounds. Of course, the effort required to produce a pound of one product and the sales price for this product which reflects this effort may be very different from product to product. For example, in very general terms, rod is cheaper to produce than sheet and sheet is cheaper to produce than tube. Accordingly, we did not feel that we could use production quantities as a distribution basis until we applied some common denominator to relate them. In the case of tonnage products, we felt that a good figure to use to weight these products was the average sales differential per pound.

This "differential" is the difference between our unit sales price and the cost of the raw metals contained in the price. In other words, we consider that we are a toll fabricator of metals, and add on cost and value to them. Therefore, our operating margin is the difference between what we pay for metals and what we sell our products for. We do not plan to make or lose anything on the raw metals. In addition, due to considerable price fluctuations in the cost of these raw metals, our sales price may change rapidly and radically, without changing the amount of this differential.

Because we had determined potential capacity quantities, it was necessary to determine a potential capacity differential. This had to be constructed using the actual differential as a point of departure. In the case of some products, because of our sales price structure, if we increase the quantity sold, we may decrease the average unit price. In the case of other products, this consideration may not have any bearing. In any event, constructed differentials per pound were arrived at to be used to weight the tonnage potentials of each department.

However, in determining a total weighted sales potential, we did not feel that we could just add to the potential sales differential for the tonnage mills the sales potential for the fabricating divisions. In an effort to put these fabricating divisions on the same basis as the poundage mills, we made an analysis of the cost of raw material included in the sales dollars. The sales dollars were then reduced by this potential raw material cost at capacity so that, in effect we were developing a sales differential in dollars for these fabricating divisions.

### *Distribution Bases — Home Office and Divisional Overheads*

With this information, we now felt that we could establish distribution bases for home office overhead. The general idea of this distribution is shown in

Exhibit 2. This statement shows, by division and department, the initial production potential established. This potential is then weighted by sales income factors, as has been previously described. This gave us a basis for distribution of home office general and administrative overhead to divisions and departments.

In a few cases, it will be noted, we left in the potential some inter-mill poundage transferred. Some of our mills break down the product in its initial cost form and then send it to another division for finishing. In some instances, this partly processed material may also be a finished product of the producing division and be sold to other customers as well as to our own divisions. We felt that the type of service rendered by the home office general and administrative personnel included the supervision, research, and guidance of the facilities and procedures required to produce this metal. Therefore, the selected inter-mill transfers were included in the distribution basis. However, when it came to the distribution of general selling expenses, it was obvious that little or no selling effort was required on those inter-mill transfers. Therefore, these inter-mill transfers are eliminated. In addition, sales from the tonnage mills to the fabricating divisions are established on a policy basis and selling and advertising expense is not involved.

At this point, we have potential sales income from outside customers, and it is on this basis that we decided to distribute the selling expense to divisions and departments. This included home office selling and advertising as well as the national sales organization. One fabricating division which has its own sales force was not included in the distribution of general selling expense. However, it does receive the general and administrative type services and is included in that distribution. We should emphasize again that these distribution bases of home office administrative and selling overheads apply only to functions which we feel are servicing all divisions equally. As indicated before, where services are centralized for only a few of the divisions, a services-rendered type of distribution procedures is followed. This applies to a central laboratory, machine shop, and that kind of function, as well as to clerical functions like accounts receivable, purchasing, and tabulating services. In some instances, we use weighted potential sales capacity for divisions using the service to be distributed and omit divisions which do not use it. An example of this is our warehouse distribution channels, which are not used by all our fabricating divisions.

We followed the same general principles in determining our distribution bases for divisional overheads to departments for the tonnage mills. However, in the case of division manufacturing overhead, we did want to make a further distribution of division overheads to what we call production service departments. These departments are principally the casting shop and scrap room. We

BASIS FOR DIVISIONAL AND DEPARTMENTAL DISTRIBUTION OF HOME OFFICE GENERAL & ADMINISTRATIVE AND SELLING & ADVERTISING

(Figures for Illustration only - Pounds & Dollars in Thousands)

| Division and Department | GENERAL & ADMINISTRATIVE | | | | | SELLING & ADVERTISING | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Weighting Factors | | | | Dist. Basis | CAPACITY ELIMINATIONS | | | | Dist. Basis |
| | Monthly Potential Production Capacity | | Diff'l Income per Pound | Sales $ Less Raw Mat'l Cost - % | Weighted Sales Diff'l | Home Office Gen'l & Admin. | Intermill & Inter-Division Income Per Pound | Diff'l Dollars | Fabricating Division Separate Sales Force | Outside Sales Diff'l | Home Office Selling & Adv. |
| | Pounds | Dollars | Pound | Cost - % | Dollars | Percent | Pounds | Dollars | Dollars | Dollars | Percent |
| Mill Division A | | | | | | | | | | | |
| Sheet Department 1 | 10,000 | | 40¢ | | $ 4,000 | 9.2% | | | | $ 4,000 | 10.1% |
| Rod Department 1 | 6,000 | | 30 | | 2,400 | 5.5 | | | | 2,400 | 6.1 |
| Tube Department 1 | 7,000 | | 50 | | 3,500 | 8.0 | | | | 3,500 | 8.9 |
| Total Mill A | 23,000 | | - | | $ 9,900 | 22.7% | | | | $ 9,900 | 25.1% |
| Mill Division C | | | | | | | | | | | |
| Sheet Department 3 | 6,000 | | 44¢ | | $ 2,640 | 6.1% | | | | $ 2,640 | 6.7% |
| Rod Department 3 | 8,000 | | 34 | | 2,720 | 6.2 | | | | 2,720 | 6.9 |
| Tube Department 2 | 10,000 | | 52 | | 5,200 | 11.9 | | | | 5,200 | 13.2 |
| Special Rolling Dept. 1 | 3,000 | | 32 | | 960 | 2.2 | 2,000# | 30¢ | $ 600 | 360 | .9 |
| Aluminum Dept. 1 | 4,000 | | 42 | | 1,680 | 3.9 | 1,000 | 38 | 380 | 1,300 | 3.3 |
| Total Mill C | 31,000 | | - | | $13,200 | 30.3% | | | $ 980 | $12,220 | 31.0% |
| Fabricating Division I | | $2,000 | - | 70% | $ 1,400 | 3.2% | | | $1,400 | - | - |
| Fabricating Division II | | $3,000 | - | 55% | $ 1,650 | 4.5% | | | | $ 1,950 | 4.9% |
| Total Company | 100,000 | $5,000 | - | - | $43,550 | 100.0% | | | $2,700 | $39,450 | 100.0% |

EXHIBIT 2

sell castings to outside customers and, therefore, wanted overhead distributions to assist in determining selling prices and profits. In the case of the scrap room, we buy outside scrap at a price below the metal value of the content of the scrap and like to know how much profit there is in handling this type of metal. Accordingly, we had to estimate the amount of our own castings which we

would have to make to supply potential production and the amount of scrap that we would handle at capacity. We also produce some of our tonnage from casting shapes which we purchase from copper refineries. This did not complicate our casting shop potential but did have a bearing on the amount of scrap handled in the scrap room.

On Exhibit 3 is shown the distribution basis for division manufacturing overhead. This statement is limited to the mill divisions with separate producing departments. In the case of the fabricating divisions, we do not distribute this type of overhead to cost centers except as an overriding overhead. The potential monthly sales capacity, or production, is the same as that used on Exhibit 2. However, the production service departments are also shown on this statement. These potentials were separately calculated. The amount of scrap made and the castings required from our own casting shops to support production at potential capacity were determined statistically. The production department then checked the production equipment to see that we had enough to handle these requirements.

Again we faced the problem of weighting these product protentials by some common denominator. We did not feel that the expense in the division manufacturing overhead pool (excluding selling) was particularly related to income. This may seem contradictory but, in many cases where price is determined by competitive or other external factors, these influences did not bear the same relation to our overhead utilization as was the case in general overhead. We considered the use of a weighting factor which would represent the total cost added to our raw material. However, this resulted in many difficulties when we considered transportation costs, selling commissions and certain other costs. It was also most difficult to determine what these costs would be at capacity, as we rarely operated at these levels.

We decided to weight production by a productivity index in terms of pounds per man hour. This index included average direct and delay man hours required to process our production, with the reservations as to product mix which have been mentioned before. This productivity index is shown in the second column in Exhibit 3. In addition to the direct production time, we felt that we should add the indirect service time required. Depending on the type of equipment in a department, we have a widely varying amount of service hours needed to keep the machines running. We have also found that, where we completely mechanized certain operations, we decreased the direct hours but increased the service hours required to keep the equipment running. The estimated indirect hours at capacity were therefore added to the direct man-hours to determine the total man-hours required for capacity production. Incidentally,

DISTRIBUTION BASIS FOR DIVISION MANUFACTURING OVERHEAD POTENTIAL PRODUCTION CAPACITY WEIGHTED BY LABOR HOURS

(Figures For Illustration Only - Pounds & Hours In Thousands)

| DIVISION & DEPARTMENT | MONTHLY PRODUCTION CAPACITY | | | | | Distribution Basis-Division Manufacturing Overhead |
|---|---|---|---|---|---|---|
| | Poundage | Pounds Per Man Hour (Direct & Delay) | Direct Man Hours at Capacity | Fixed Indirect Hours at Capacity | Total Man Hours at Capacity | |
| Mill Division A | | | | | | |
| Sheet Department 1 | 10,000# | 80 | 125Hrs. | 30Hrs. | 155Hrs. | 33.4% |
| Rod Department 1 | 9,000 | 150 | 53 | 10 | 63 | 11.7 |
| Tube Department 1 | 7,000 | 40 | 175 | 40 | 215 | 46.6 |
| Production/Service Dept. 1a (Casting) | 18,000 | 1,000 | 18 | 4 | 22 | 4.8 |
| Production/Service Dept. 1b (Scrap) | 10,000 | 2,000 | 5 | 1 | 6 | 1.3 |
| Total Mill A | 53,000# | - | 376Hrs. | 85Hrs. | 461Hrs. | 100.0% |
| Mill Division B | | | | | | |
| Sheet Department 2 | 10,000# | 95 | 105Hrs. | 25Hrs. | 130Hrs. | 54.2% |
| Rod Department 2 | 12,000 | 185 | 65 | 15 | 80 | 33.3 |
| Production/Service Dept. 2a (Casting) | 24,000 | 1,200 | 20 | 5 | 25 | 10.4 |
| Production/Service Dept. 2b (Scrap) | 7,000 | 1,750 | 4 | 1 | 5 | 2.1 |
| Total Mill B | 53,000# | - | 194Hrs. | 46Hrs. | 240Hrs. | 100.0% |
| TOTAL ALL MILLS | 227,000# | - | 1,124Hrs. | 258Hrs. | 1,382Hrs. | |

**EXHIBIT 3**

these man-hours excluded salaried hours for supervision or general overhead. A distribution basis for division manufacturing overhead was constructed on these man-hours at capacity production.

In the case of division selling overhead, we used the same basis as determined for the home office selling and advertising expense, as shown on Exhibit 2. In this case, we did not feel it necessary to distribute the expense to the production service departments.

## *Other Uses of the Distributions*

In connection with long-range planning, we have been interested in estimating overheads and their distribution for periods considerably in excess of one year. We have been able to do fairly well on estimating overheads. The procedure described has been used as a distribution basis for these projected overheads. The overhead projections are furnished to our divisions to be included in their future estimates of operations. These estimates are of several sorts. Our construction planning has had to be forecast for 2 to 5 years in advance, in consideration of estimated equipment deliveries, financing problems and similar reasons. This has given us the approximate information on changes to be expected in production potentials. As part of our planning, we also estimate long-range sales projections. However, we have used projected production potential as a basis for distribution, even though we felt that this was beyond sales expectations.

We have found that the information relating to long-term overhead distribution to projected department operations has been very useful. In many ways the impact of overhead has had important effect on our planning. In our mill

divisions we have developed a process cost accounting for our poundage products. We are beginning to explore the desirability and feasibility of segregating these costs in a manner quite similar to a fixed and variable segregation. In this connection, we have felt that this type of overhead distribution, which comprises the largest part of our fixed cost, is very valuable. In the fabricating divisions we pretty much use a job costing system. Here again the advantages of a fixed cost distribution of a fixed overhead have been apparent to us.

We think that this system of overhead distribution, which has been in effect for several years, has removed a major part of the distortion previously introduced into department operating statements. In addition, it has helped to develop a realistic attitude in connection with questions concerning the operation of these departments. Knowing fairly well the amount of overhead which must be carried in a department, our management has become more aware of the operating problem involved in a heavy industry.

# Cost Accounting as a Motivation Technique

by NORTON M. BEDFORD

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***A new cost construction, probably a special-purpose type of standard cost in the majority of cases, is envisioned in this article and presented as likely to have, in the long run, considerable effect on the serviceability of accounting and the practice of management. The proposal is to devise costs which, in appropriate detail, will serve to particularize work goals and serve as stimulus to their achievement. How this might be done is given both general description and particular illustration.***

THE FUNCTION OF COST ACCOUNTING in business management has never been precisely defined. In a broad sense, however, there appears to be general support for the view that cost accounting plays a role in the three areas of determining income, planning future activities, and controlling current operations. In addition, there appears to be general recognition that the role of cost accounting in each of these areas is expanding in scope and improving in technique. Coupled with developments in production quality control, business forecasting, automation, and many other innovations, cost accounting has contributed much to the rapid growth of our economic system within the last decade.

It is the purpose of this article to provide an overall picture of the use of cost accounting as a means of motivating in a direct manner the future activities of various individuals within a business firm. The article is based on an assumption that motivation falls within the scope of that area customarily defined as operational control. The justification for this assumption rests on the belief that control represents the concepts, methods and techniques used by management in directing the activities of the company or selected segments of it so that plans of management are carried out.

## New Role of Cost Accounting in Control

There has been much confusion in cost accounting literature as to the meaning of control. Typically, the assumption has been that control reports represent a comparison in a systematic manner of actual results with some kind of a standard, which is disclosed to management on the assumption that management will apply corrective actions to prevent variations from standard in the future. In this sense, cost accounting control reports have been in the nature of informational reports to be used in directing management attention to areas

believed to be in need of attention. It is readily apparent that such accounting reports do not control anything but are aids to management in controlling operations by other methods.

It must not be assumed, however, that cost accounting should be or is restricted to informational reports useful in directing the attention of management to areas in need of control. In its early years of development, such an assumption may have been warranted but, shortly after the development of standard costs, it became apparent that scientific standards, in contrast with estimated costs, were accepted by employees as an objective toward which they should strive—and they were motivated to attempt to meet the standards. Thus, almost without managerial intent, standard costs came to play a very important role in directing the activities of employees toward the pre-conceived objective envisaged by management. Some accounting literature recognized this new role of accounting reports and the concept of "preventive control" was coined to differentiate the motivation aspect of cost accounting standards from the "corrective control" resulting when variations from standard were conveyed to management.

Actually, of course, corrective control is a misnomer, for it controls nothing. At the very best, it may be conceived as a control report in that it pretends to control the activities of supervisory management by requiring from them action which will correct the future activities of employees to see that they follow the pre-conceived plans. But, in no sense, does it control the activities of the employees on whom it is applied. Control is something which must take place before action. It cannot exist "after the fact." If a mistake has been made in the past, there is no means of controlling that mistake. The only recourse left is to control future operations of a similar nature. Thus, the essential nature of control involves not so much the correcting of past mistakes as the directing of the current and future activities in such a manner as to assure the realization of management plans. In a sense, control becomes methods of motivating various members of a business organization to assure actions on their part which are to the benefit of the firm. Normally, such action will involve the carrying out of the adopted plans of management. It is in this area of a realistic view of control that cost accounting appears destined to expand in the future. Yet its expansion in this area may require adjustment of many of the concepts now underlying standard cost procedures.

### Current Practices Directed at Motivation Control

The concept of a standard cost covers a wide range of numerical amounts. These amounts vary from what it is expected a cost should average over an

extended period of time to an estimate of what current costs will be for the coming budget year. As applied in practice, there are such a variety of uses to which the estimated amount is applied that there is no such thing as one standard cost of an activity or a product. Rather, there are a host of standard costs, the appropriate one in any instance depending upon the use to which the cost is to be put. This recognition of the existence of multi-valued standard costs help open the door for the development of an entirely new area for cost accounting in the area of control. Such use of cost accounting rests upon a further assumption that control must involve the directing of people, for control of material and other inanimate objects is accomplished by controlling the activities of persons dealing with them. That is to say, for example, that material control is accomplished by controlling the actions of persons responsible for acquiring, stocking, and using them. It is evident, therefore, that, if employees can be motivated to perform according to managerial plans, control of all aspects of the business will be accomplished. Prior to the development of large-scale operations, such control was accomplished by direct action of the owner-manager of the company. As expansion in size and increase in variety of activities took place, the observational motivation method of control gave way to impersonal techniques for inducing employees to comply with the wishes of management.

As has been pointed out, the initial procedure was to provide a system for informing management of the areas in which direct observational motivation should be applied. In our changing and expanding economy, with large-scale operations becoming the rule rather than the exception, this procedure must be augmented by effecting control through reports without the use of the direct motivational efforts of supervisory personnel. It has been noted that employees have assumed responsibility for meeting an imposed standard and this psychological factor opens the door for the cost accountant to construct pre-determined cost amounts in any manner which will motivate the reader of the report to perform that which is planned for him to do. It is apparent that, under this view, the pre-determined or motivation cost construction may be any amount ranging from a highly involved engineering calculation to a cost bearing no relation to the economic values concerned in the performance of the economic activity for which the employee is assigned responsibility. The criterion of a successful motivation cost construction is only that it motivates the person to whom it is reported to do that which managerial operational plans require.

The development of cost accounting into this newer area should not be looked upon as deceit or an underhanded approach toward management of employees. Similar devices, such as quotas, have been used extensively in business practice

Possibly an illustration of the manner in which costs may be constructed to serve as a motivation device may indicate more clearly the appropriate use of the idea.

### *Motivation Control Illustrated*

Let us assume that Company X provides maintenance service for all departments from a centralized maintenance department. The procedure in effect is that the operating department heads requisition such maintenance work as is needed from the central department. Maintenance employees are paid by the maintenance department and the total cost of operating the maintenance department is collected as a responsibility of the maintenance department head. Because the maintenance department is a service department, its total costs are then re-allocated to operating departments on the basis of the hours of maintenance employees' work in each department. Thus, if maintenance department costs were $200,000 and total maintenance hours worked during the period were 50,000, then each hour of maintenance work requisitioned by an operating department would be charged at the rate of $4 per hour.

It is readily apparent that no way exists of determining whether the $4 rate is the correct rate and the manager of an operating department may insist that the rate is too high and use this as an excuse for operating delays and higher overall costs in his own department. As a result, let us assume, top management decides to give the operating departments the right to use or not use the services of the central maintenance department but to hold the operating departments responsible for all departmental costs. Normally, this procedure requires the establishment of a pre-determined standard rate for intra-company maintenance charges to avoid favoritism by the head of the maintenance department of one department over another in the rate charged. Establishing a standardized maintenance charge applicable to all operating departments places top management in a position to encourage extensive use of the centralized maintenance department or discourage such use, by establishing a low or high maintenance charge.

If it is the policy of top management to maintain the plant in the very best of condition, it is apparent that departmental heads may be motivated in this direction by having a very low standard maintenance charged per hour of work assessed. A high rate might restrict the use of the central maintenance department and motivate minor maintenance work on the part of departmental operating employees and might result in something less than perfectly maintained factories. It is apparent to most men of business that the appropriate maintenance policy varies from company to company and from time to time and no accountant should assume responsibility for assuming either a high level or a

low level of maintenance to be the correct maintenance policy. The appropriate level of maintenance depends upon a variety of factors, but accountants should assume responsibility for carrying out the adopted policy of management on maintenance through the use of the motivation cost construction embodied in the standard or uniform maintenance rate.

The preceding illustration suggests the use of a cost construction for motivation which would be of no value for income determination, of limited value for planning, and certainly questionable as a method of corrective control. It would be most effective as a method of control through motivtaion reports. It demonstrates a usable concept of cost with which cost accountants should become intimately acquainted. It is labeled "motivation cost" in this article. For it the most appropriate cost is that which accomplishes the objectives for which it is constructed. Such a concept opens the way for the cost accountant to enter into the rapidly developing field of motivation. In terms of cost accounting, it means the kaleidoscope of cost constructions available as an aid to management must be broadened if the full potential of cost accounting is to be realized.

Full use of the concept of motivation costs may require a reclassification of certain accounts now used in cost accounting for control. This may result as efforts are applied to have the motivation cost construction explain precisely what the employee is to do with what resources and at what time. Budget accounts which are often used as a means of advising departmental heads and workers what they are to do may be presented in more detail to assure compliance with managerial plans. In a sense, the detailed classification may transfer some of the normal activities of a department head in detailed planning to a centralized overall planning operation. Employees would be informed by a detailed budget what they should do rather than relying on the direction of a department head. This development, in turn, may increase the number of employees one department head may supervise.

Supplemental to the concept of motivation cost constructions is the view that motivation is most effective when only those costs for which the person is wholly and completely responsible are assigned to him. Procedurally, this means that only these costs should be included as motivation costs. This suggestion rests on the assumption that little is accomplished by assigning motivation costs to a person for actions for which he is not completely and wholly responsible. Responsibility is construed to include authority for the acquisition of the "right amount" at the "right time" and at the "right price," authority for directing the use of resources acquired and authority for the disposition of the various resources on hand in the "right" manner. Although operating heads are sometimes made to assume responsibility for the use of all resources of the firm,

this procedure often falls down when the user has no authority over the price or ordering of the items used. There should be developed in the future means of dividing responsibility into five rather distinct areas, as follows:

1. Responsibility for indicating when specific types of resources will be needed and in what amounts.
2. Responsibility for acquiring the resources needed at the best price and quantities.
3. Responsibility for safeguarding of resources acquired until they are to be used.
4. Responsibility for deciding when, where, and how many resources are to be used in a given period of time.
5. Responsibility for use according to plans of the resources which are used.

Until this is accomplished, however, motivation cost constructions should be prepared, in any amount believed to be appropriate, for only those costs for which the person is wholly and completely responsible. This may broach one of the problems in the application of direct costing, for there is some evidence to suggest there is a need for the development of motivation cost constructions in the areas of direct costing.

An extensive amount of confusion now exists because of the general reluctance to accept the fact that cost accounting needs to develop into the area of motivation control and because of the difficulties involved in defining responsibility. However, it should not be assumed from this that a large segment of the costs of a business enterprise will not be assigned as the responsibility of anyone. Rather, as is generally recognized, the responsibility concept assumes that all cost will be assigned to someone. Advances toward use of motivation control may well result in the assignment to higher echelons of management of responsibility for many actions which have heretofore been assigned to the lower levels of management. It is the belief of this author that our business economy now suffers from a tendency to shift responsibility to lower echelons of work and, in this manner, to permit upper management to relieve itself of responsibility. There is need for correction of this situation. Responsible accounting coupled with motivation control may be the answer to this malignancy rapidly developing in the area of business management.

### *Methods for Assigning Motivation Costs*

As to methods, it becomes possible to assign motivation costs in a variety of procedures. First, the motivation cost construction may be assigned in very specific and detailed amounts according to the person responsible. This method may be referred to as close control, for it requires compliance with the detailed plans of a higher management. It leaves little initiative to the department head in deciding the detailed methods for operation of his department. Alternatively, the motivation cost construction may be in terms of a minimum or a maximum

allowance for the person or department, without any detail as to the specific manner in which the person is to be motivated. This second method may be referred to as loose motivation and may be supported because it would encourage initiative on the part of employees.

The danger of loose control, of course, is that department heads or individuals may not assume the initiative allowed. If this condition exists, loose control may allow waste and inefficiency. Realistically speaking it seems that most of the motivation cost amounts will lie in between the two extremes of rigid and inflexible cost constructions and the loose and general control procedure. Different situations, of course, may cause one portion of a business to fit into a rigid cost control procedure and another portion to operate most effectively under different degrees of control. Considerable judgment and experience will be required of accountants in determining the most appropriate degree of control to apply in the motivation cost accounts.

### *Evaluation of the Application of the Motivation Cost Concept*

The suggestion that motivation costs should be added to the tools of the cost accountant has been submitted to twenty industrial accountants in the Middle West. The presentation made to them, on the case for inclusion of this concept as a part of cost accounting, was substantially the same as that presented in this article. Reactions to the proposal may be classified broadly as follows:

1. **The proposal is similar to the controversy of a few years back on the relationship between quotas and budgets.**
2. **Motivation costs are not costs at all and have no relation to cost accounting.**
3. **The proposal may be good theory but practically every person might be motivated by a different cost construction and accountants would never know what type of a cost build-up was appropriate.**
4. **The proposal is in use now in some of the standard costs used, though in more conventional terms.**
5. **The proposal appears sound and will be applied in a limited manner to the costs of the personnel department to encourage department heads to make more use of the facilities of the personnel department.**

Most of the objections to the proposal rested upon an assumption that the use of motivation costs would represent an underhanded practice. As soon as employees became aware of it, the resulting reaction of suspicion which it would engender would do more harm than any good it might accomplish. When it was explained that no motivation cost construction should ever be developed without the full knowledge of the employee on which it is imposed, most of the objections were withdrawn. Actually motivation cost constructions appear to have their greatest use as a means of communication. Essentially they represent a method of advising employees in an effective manner what they are to do. In a sense, they will perform the same function which a departmental budget

does when it informs departmental heads what they are to do, in a general way.

There are, of course, many techniques by which employees are advised of what they are to do. Oral instruction is possibly the most widely used procedure. Written instruction in composition form is used in many rather precise instructions. These conventional methods of communication rest on an assumption that employees are motivated to perform in the most efficient manner that which they they are directed to do by oral or written instructions. There is much evidence to suggest that such an assumption is not always valid. Motivation cost constructions should be looked upon as supplemental to the conventional communication techniques. They may be more precise at times in the information conveyed or, as in the case of the illustration on maintenance costs, more general, but they have the uniform characteristic of inducing action on the part of the person to whom they are transmitted. It would seem that the objections raised by a few of the twenty practicing accountants may be answered in the following manner. Motivation costs are not quotas and have been recognized as costs in many cost constructions for standard costs. They have both general and specific application and may be constructed in terms of general motivation costs without extensive psychological studies of employees.

### *Reservations*

There is need for extensive research in the area of the application of motivation costs to cost accounting procedures and techniques. Because there is considerable interest in management today on the problem of motivation, accountants must take care to be certain of their techniques and procedures and not allow themselves to enter this broad new area of opportunity without careful investigation. At the present time, the concept of motivation cost constructions must be primarily an attitude of mind rather than any systematic procedure. The question to be raised now is whether specific cost accounts and amounts may be improved as instruments of motivation without destroying the basic function they now perform. As research and investigation provide a systematic framework for the development and presentation of motivation cost constructions, the cost accounting profession may then be receptive to more formal methods for implementing the concept.

# Developing Supervision in the Accounting Department

by E. E. ROLL

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*Given here is the author's viewpoint relating to the development of accounting supervision, together with an outline of recommended methods. The paper is directed to accountants who must operate their function through one or more supervisors. The recommendations given are intended to help them avoid neglect of this area and to be effective managers in their own right.*

WHETHER THE ACCOUNTANT is called controller or by some other title, he has a recognized place in the policy making echelon of the organization. The primary basis for this recognition is his ability to develop financial and statistical facts which can make a contribution to forward planning, to assist in converting that information into specific objectives, to report results and measure them against stated objectives, and finally to suggest how performance might be improved. All of these things reflect the accountant's ability as a technician, his capacity to analyze information, relate it to a specific situation and bring an informed judgment to bear in decisions for action.

But, in a business of any size, this technical competency must be supplemented by administrative ability. The accountant must be capable of building an organization, staffing it with a wide variety of competent personnel, training them, motivating them to high standards of performance, measuring their results, and developing their potential. Here he becomes a manager in the broadest sense, a manager of people, and his success will be dependent in great measure on his leadership qualities. This is the area I should like to explore. Every accountant who hopes to attain management status must be able to achieve results through people. There is a growing fund of knowledge as to the requirements of a good manager. The basic principles apply at any level of management, whether we refer to a first line supervisor, a department head or a controller.

If a manager gets results through people, a corollary is that a most important part of his job is the development of people. Starting with that premise I should like to suggest that there are five important considerations in the development of people. As indicated, my discussion of them will be from the viewpoint of the controller who is concerned with building and developing a

management team in his own area of responsibility, but the principles would be equally valid were he to achieve higher rank and be faced with the same problem as president of his company. Furthermore, a department head with five or six first line supervisors, operating in a much more limited area, can use them to equal advantage. The five considerations, which will be dealt with in the remainder of this article, are:

1. Selection of supervisors.
2. Induction of supervisors.
3. Assignment of responsibility and authority.
4. Development of standards of performance.
5. Appraisal and review of performance.

## Selection of Supervisors

Choosing supervisors is the starting point in building an effective organization. If we had the gift of clairvoyance, perhaps we could always pick the best man for each job, but I suspect that we do not even use all of the means at our disposal. If we appreciate the importance of this first step, we should at least be willing to spend some time in planning how to approach it. Here are some suggestions which have worked in practice:

1. List job requirements—This seems obvious, yet I think that often it is not done completely. A job description is not enough. Ask the man now on the job and other supervisors whose operations are inter-related, to help set down the requirements. You will come out with something far different and much better for your purpose than a mere job description. Do not forget that you are choosing a supervisor, a manager. The list of requirements should stress the managerial aspects of the job-planning, organizing, leadership, ability to motivate people—even more than technical competence.
2. Consider all qualified personnel—If we want the best man for the job we ought to look at all those who appear to have the qualifications. Many times we assume that the "number two" man is the only one deserving of much consideration but, often enough to make it worthwhile, somebody else can also compete and sometimes win.
3. Rate candidates according to requirements—Here I suggest that two or three judgments are better than one. If you can find someone familiar enough with the job to help you—perhaps your assistant or a staff person—your rating should be more objective and accurate.
4. Human relations tests—There are in existence some pretty good tests to measure the extent of a person's ability to get along with, direct and stimulate other people. Such tests ought to be administered and interpreted by experts. Furthermore, they should not be the sole criterion. However, they are helpful to supplement existing knowledge about the candidate's capacity to deal with this very important area. It has been proved pretty conclusively that the best workman does not always make the best supervisor. The latter must have some understanding of and appreciation for the complex nature of human behavior.

## Induction of Supervisors

The transition from a rank and file job to a supervisory job is a big step. It requires a complete change in viewpoint on the part of the individual. Hence

a well thought out program of induction is essential and the individual's supervisor ought to do it, not a staff person. Only the superior can apply the required emphasis. Furthermore, it is during this period of training that the desirable personal relationship between the superior and his subordinate can be developed.

Any induction program should be comprehensive enough to cover all of the many facets of a managerial position and should encompass company and departmental policies and objectives, so that the new supervisor can immediately begin to look at things in the broader perspective of a manager. It must be geared to the individual's needs. Some will absorb it faster than others. It is my own feeling that such a program, to be fully effective should extend over a period of about a year. Of course, the training and development of subordinates should never end. This particular phase of that activity, however, should probably have a terminal date, coinciding with the time when the decision is made as to whether the new supervisor has passed the test or has failed to show the capacity to remain in the new assignment.

During the induction period there should be periodic interviews, in which the superior sits down with his subordinate and discusses the latter's progress. I ask my department heads to write brief resumes of such interviews with their supervisors, and these, too, I inspect. At the end of the induction period I ask the department head to come in and tell me about the new supervisor's progress and what plans he has for further development.

### *Assignment of Responsibilities and Authority*

Everyone will agree that, unless we know what is expected of us, we cannot do a good job. Do we always make a special effort to spell out clearly and unmistakably those responsibilities for which we hold our subordinates accountable? Beyond that, do we give the necessary authority to permit them to carry out those responsibilities? Here are a few thoughts on how this can be done most effectively:

1. Discussion and understanding—In approaching for the first time this matter of defining precisely the responsibilities of a supervisory job and the requisite authority, I believe it should be done by discussion between superior and the subordinate. This permits the viewpoints of each to be reflected as differences are resolved. It is the only way to insure complete understanding. The subordinate gains a much better insight into what his superior expects of him, particularly in the emphasis which the boss places on different facets of the job. Likewise, the authority necessary to carry out the assigned responsibilities can be agreed upon. The result should be a common understanding, much less subject to future misinterpretation than would otherwise be the case.
2. Write it down—After agreement is reached, a written statement of responsibilities and authority should be prepared. Here, too, there should be mutual agreement as to the appropriate language in which to express the understanding previously reached. For the same level of supervision, the responsibilities

and authority for certain management aspects of several jobs might very well be identical. For instance, all supervisors at a certain level might have responsibility and authority to hire, discharge, promote, train and otherwise handle specified personnel matters. On the other hand, some responsibilities would undoubtedly vary according to technical and other requirements of the work.

3. Follow-up by superior—This is necessary to be sure that responsibilities are assumed and authority is not exceeded. In training a new supervisor, the assumption of responsibility may be gradual but the man's superior should guide and direct the process so that complete performance is attained as quickly as possible. Or, if the reverse happens and the man does not grow into the requirements of the job, we want to find it out in time to correct the situation.
4. Review and revision—If we are to develop our subordinates fully we must look upon this aspect of their job as dynamic. Not only does the job change, so that responsibilities must be revised; the man himself changes so that to capitalize fully on his capabilities, we increase his responsibilities. This is vital to the growth of the individual. Nothing is so stultifying as a job which does not challenge. If the job cannot be changed to provide that challenge, we ought to move the man to a more responsible position.

### *Development of Standards of Performance*

The title, "controller," not only emphasizes the principal function of the chief accounting officer but also implies that, in exercising control over the operations of his company, he has some definite yardsticks by which to judge performance. In other words, control necessitates standards of performance. Production and cost standards, budget variances, financial ratios and other such measures are of long standing and are highly developed tools to spotlight operating and financial areas needing attention. But how does the controller spot the imperfections of his management team? I suspect that very seldom does he have standards by which to judge managerial performance. Admittedly they are more difficult to develop because they involve many intangibles, but some fruitful work has been done in this area and the need for attention is fast gaining recognition.

Let us assume that we want to develop standards of managerial performance for a group of department heads, each of whom is in charge of a fairly broad area of accounting operations, such as cost accounting, plant accounting, financial accounting, data processing, taxes, etc. How could we go about it? It must first be determined who should develop these standards. I submit that it ought to be done by the controller and his department heads working together. If the latter are to be judged by such standards, they ought to have a part in setting them so that there will be no question of the acceptability of these standards as reasonable measures of performance.

For managers at the department head level there will be many parts of the managerial job for which uniform standards can be set. Developing these measures of performance in group discussion meetings with the superior has many advantages. The latter gets a chance to present his philosophy of management in stating how he expects these subordinates to operate. The subordinates, in turn,

can contribute their ideas of the conditions which will exist if they are doing a satisfactory management job. If the proper climate of participation and mutual respect exists, these discussions will result, not only in better measures of performance but also in greater understanding of what is expected.

One revealing feature of such meetings is the variation among individuals in their understanding of what constitutes good performance. Gradually, as discussion progresses, you begin to see a narrowing of differences. The insistence of some individuals on relatively high standards tends to prevail. Many times the subordinates will set higher standards than their superiors would have insisted upon. Thus, the discussion is much more productive than the final written standards indicate. Even though the latter are rather general and somewhat vague to an outsider, those who contributed to them have a common understanding of what is meant.

The procedure of these discussion meetings might be as follows. First, some attempt should be made to break down the managerial function into its various segments such as organization planning, work scheduling, communications, delegation of responsibility, controlling costs, supervisory development, reporting results. Each of these segments should then be defined, after which the performance standards (conditions which will exist if a job is well done) can be developed. An example of the resulting written standards for one such segment is as follows:

*Supervisory Development:* The process of helping supervisors improve their present performance and of making them better fitted for consideration for advancement. Performance is satisfactory when:

1. Newly appointed supervisors are suitably and promptly inducted as evidenced by:
   a. Use of supervisory induction check list.
   b. Periodic reports on supervisor's progress.
   c. Adequate use of "basic supervision" course.
2. Periodic and analytical evaluations of individual performance are made on the basis of continually improving supervisory standards.
3. Plans are made to improve the individual supervisor's performance.
4. Specific steps are taken to carry out the plans. (Examples: daily contacts, supervisory meetings, solutions to problems, participation in department operation, delegation of additional responsibilities and authority, etc.
5. There is evidence of an alertness to development opportunities for individuals.
6. There is evidence that the supervisors are improving their performance and are working up to their individual capabilities.
7. Replacements are available for jobs of greater responsibility.
8. The superintendent [department head] has developed within his supervisors a desire for self-improvement.

Let me warn against trying to use the above example (or any other) without adaptation. It is illustrative of one result situation only. No application made without going through the process of discussion, argument and exchange of ideas and viewpoints would have much meaning. That process takes considerable time but it is tremendously productive.

### *Appraisal and Review of Performance*

Just as the accounting process is finally subjected to an appraisal and review of results, so must the management function, if we are to determine its success or the need for improvement. If the controller has given thoughtful consideration to the selection of his subordinates, has followed a definite program of induction, has assigned appropriate responsibilities and the requisite authority, and has developed high standards of performance, he is well on the way to creating a satisfactory management team. The next step is periodic appraisal of results in order to correct shortcomings, reward good performance, and plan further development of the individual. I believe that such an appraisal should be made annnually of every member of management, including the first line supervisor.

I also think this appraisal should be by the individual's immediate superior, assisted by two or three others of a level higher than the individual being appraised. This is called the group appraisal method. This process is not to be confused with merit rating which is usually done by checking off varying degrees of satisfactory performance against a long list of job requirements. Here, instead, the appraisal group gets together and discusses the subordinate's performance, in both general and specific terms. What has he accomplished? How has he done it, i.e., what methods does he use to get results? What are his personal characteristics and how do they affect immediate performance and his prospects for advancement? What are his strong points and weaknesses? In what area must he improve? How can we help him?

All of these things are discussed with reference to the responsibilities which have been assigned and the standards which have been set for the job. The primary concern is to assess present performance, with the objective of doing everything necessary to help the man to master all phases of his job. If the appraisal group recognizes potentialities beyond the immediate job requirements, it may recommend ways to further the individual's development, but the recommendations will be tailored to his particular situation as revealed by his needs. Furthermore, my personal conviction is that usually we can provide opportunities for further development on the job through the demands we make on the subordinate, the additional responsibilities we can assign and the problems we force him to meet and solve. These are more realistic and meaningful than the best of formal training programs divorced from the work situation.

After the appraisal is completed the superior sits down with his subordinate and reviews it with him. He praises good performance and discusses how to overcome any weaknesses. Agreement is reached on what steps need to be taken for further development. Thus, the subordinate knows where he stands

and what he needs to do to improve. He also knows that this is a group judgment, not that of one individual. It is pointed toward helping him, not merely criticising. In turn the superior gains a more intimate knowledge of each subordinate's accomplishments and how he handles his job. He has an inventory of his management team to help him plan for the future.

Despite the publicity currently being given to the shortage of engineering and scientific personnel, the scarcity of top notch managers is of equal if not greater concern to business. Industry is recognizing this by placing increased emphasis on management training and development. This paper has attempted to describe briefly some of the techniques which have gained wide acceptance as being essential tools through which a manager may build and develop an effective organization. The accountant who wishes to become a successful manager needs them, as well as the production manager, the sales manager or the manager of any other function.

# Breaking Out of the Limitations of Break-Even Analysis

by RICHARD W. CONWAY

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*It is the thought of the present author that the multi-dimensional analysis which alone is realistic in interpreting the company break-even situation in terms of varying product mix, but which is impracticable of graphic representation, may be programmed for a computer and significant results plotted. The paper is not procedural in character, but, rather, deals with fundamentals of cost-volume-profit analysis and possibilities for its refinement.*

THE WIDESPREAD ADOPTION of simple break-even analysis by business executives, management consultants, labor union leaders, investment analysts and governmental agencies is somewhat surprising and comes in the face of patent and grievous shortcomings which should on the surface severely limit the usefulness of the device. The common form of the break-even chart and its derivative, the profit-volume chart, are shown in Exhibit 1. The technique offers a static analysis of a dynamic problem. The postulation that profit is a single-valued function of volume is perhaps just barely defensible in situations in which volume has been monotonously increasing for a period of years, the condition which has obtained in many industries in recent years. Moreover, the empirical difficulties involved in formulating a useful breakeven chart would appear to be a serious impediment to its widespread use.

Nevertheless, the practice has flourished, continually acquiring new adherents and new uses. One can only conclude that an unsuspected stability exists which makes practical the use of a static tool, that empirical cost and revenue functions of acceptable quality are forthcoming from existing reporting and record-keeping procedures at a reasonable cost—(probably, at least in part, using information that is a byproduct of analysis functions already performed) and that, in short, the break-even chart is an effective tool for gross profit planning in spite of recognized limitations.

## The Outstanding Limitation of Break-Even Charting

The characteristic which has limited the use of break-even analysis more than any other is undoubtedly the relative inability to treat multiple-product firms or situations. Inasmuch as a very large majority of business concerns pro-

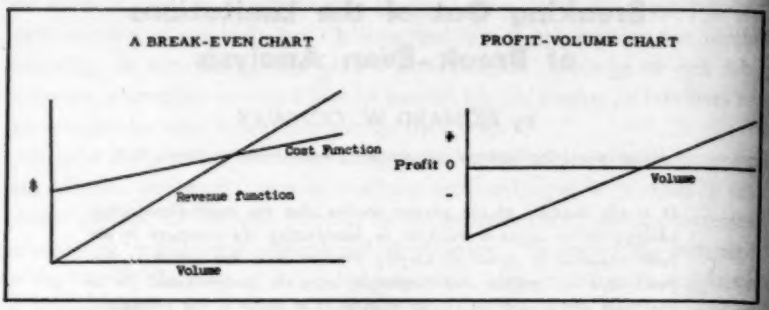


**EXHIBIT 1**

duce more than one product or service, a practical operating tool must of necessity be able to cope with multi-product situations. The fact that break-even analysis has flourished in spite of the various less-than-satisfactory methods of treating multi-product situations attests to the inherent desirability of information on the functional relationship between profit and volume.

Fundamentally the difficulty lies in the manner of expressing a measure of volume. For the rudimentary single-product chart, the volume scale for the abscissa can be taken to be dollar volume, unit volume, or percentage of capacity. Where more than one product is involved, unit volume is immediately meaningless (unless a synthetic "equivalent" unit is defined) and a given value of dollar volume or per cent utilization of capacity no longer completely specifies what is being produced. Profit is no longer a function only of the total volume (assuming that this is true even for a one-product firm) but also of the product mix. To overcome this, the basic one-product curve is often extended to the multi-product case by what is in effect the creation of a synthetic composite product. This is the logic of assumption of constant product mix. It is assumed that the relative proportion of each actual product remains fixed, independent of changes in volume. While this strategem permits the use of the break-even chart in a multiple-product situation, it also robs it of much of its usefulness, for the investigation of changes in product mix is an important part of break-even analysis. The proportion of various products is often more susceptible to change than are either costs or product prices.

### *Existing Methods of Charting the Multi-Product Situation*

An obvious alternative procedure is to use a separate break-even chart for each of the products involved. Whatever this approach can claim by way of

straightforward adaptation to the more complicated situation, it also possesses some undesirable limitations. Perhaps the most serious is the problem of allocating various costs among the different products, particularly fixed cost categories. These contain many elements which cannot properly be attributed to an individual product. This implies that the whole is not equal to the sum of its parts, that break-even on each of the individual products is not the same as break-even for the firm. Moreover, it must be acknowledged that the process has sacrified some of its simplicity and clarity of presentation. The analysis for the firm as a whole is now a summarization of a number of curves, with an appropriate correction for unallocable costs, rather than a single curve. There might also be some question as to whether or not the various cost and revenue functions are readily separable into curves for individual products. Joint products offer complications here.

A modification of this procedure for separate product representation has been offered in the form of the profit polygraph. (Profit Polygraph for Product Mix Evaluation. Paul A. May. *N.A.C.A. Bulletin,* Nov. 1955.) The polygraph plots the individual curves for each product on parallel lines on the same piece of paper in a form of nomagraph. A method of accumulating the total from the individual products is prescribed. All of the limitations cited above for the use of individual products break-even curves are pertinent to the profit polygraph. If the polygraph is afforded some advantage by its built-in method of aggregation, this is largely offset by the greater complexity and the departure from the familiar graphical formulation.

Perhaps the most satisfactory way used at present for treating multiple-product situation, is the sequential consideration of individual products on a single profit-volume chart (Exhibit 2.) Using this approach, the profit function for one product is plotted against volume for it just as if it were the only one produced. The profit function for a second product begins where that for the first product leaves off. Successive profit functions are combined by graphical vector addition. The resultant, or vector sum, is a composite profit function for the entire firm. This composite chart can be used in somewhat the same way as the simple, single-product chart. However the break-even point is almost an empty concept. The point at which the segmented profit function indicates a zero profit does not qualify as a break-even point, because this point obviously depends upon the order in which the products are plotted. The point at which the resultant or composite profit function indicates zero profit is also not a meaningful break-even point, inasmuch as to regard it as such would imply that the product mix remained constant, regardless of changes in volume—exactly the restrictive assumption that this procedure is intended to avoid. There may be

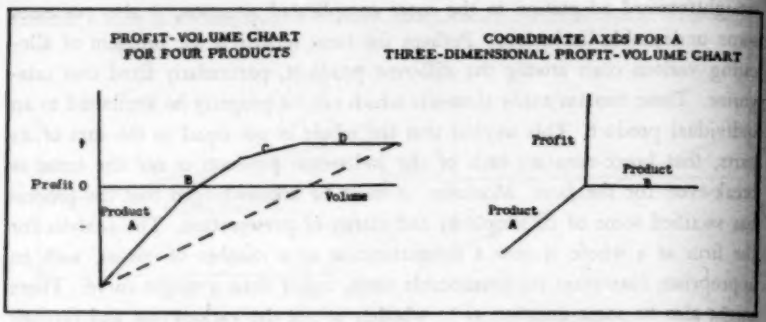


**EXHIBIT 2** **EXHIBIT 3**

question as to whether or not the several profit functions are mutually independent and there is certainly a practical limitation on the number of separate products which can be represented on a single plot without destroying the significance of the chart. Still this plotting-in-sequence remains the most acceptable method in current popular practice for treating multiple product situations.

### *Multi-Dimensional Analysis*

The problem lies in the fact that volume is a multi-dimensional quantity, having as many dimensions as there are products manufactured. All of the above procedures represent devious attempts to plot an n-dimensional quantity in one dimension—along the abscissa of the chart. An obvious alternative to that line of attack is to accept volume as a multi-dimensional quantity and resort to multi-dimensional break-even charts. Of course, the immediate consequence is the sacrifice of the ability to plot the chart on a two-dimensional medium. If there are n different products, n + 1 dimensions are necessary for the chart. A two-dimensional medium is only appropriate for a single product.

A two-product, or three-dimensional, chart is still capable of physical representation. Three mutually orthogonal coordinate axes are used, distance along two of the axes representing volume of the two products and distance on the third axis representing profit, as in Exhibit 3. The profit function is now a surface rather than a line and, if consideration is limited to linear functions, as is common practice in traditional break-even analysis, the profit surface is a plane. Just as the conventional profit-volume chart gives a value of profit associated with a given value of volume, the profit surface gives a value of profit associated with a pair of values of volume—the volume of each of two products.

This profit-volume chart may be used in much the same way as its two-

dimensional counterpart to investigate the impact of projected changes in sales volume, sales prices, or costs. Conventional two-dimensional profit-volume graphs result from plotting the intersection of the profit surface with planes that are parallel to the coordinate axis representing profit. If the cutting plane is also parallel to one of the product axes, the resulting plot of the intersection with the profit surface is a conventional two-dimensional profit-volume chart relating profit to the volume of one product, with the volume of the second product held constant. In the general case, with the cutting plane not necessarily parallel to one of the product axes the volume of each product bears a simple linear relation to distance measured along the cutting plane. In the special case where the cutting plane contains the profit axis, rather than just being parallel to it, the intersection with the profit surface is the profit function for constant product mix. There is an unlimited number of such planes, each representing a different product mix.

The generalization to more than two products or three dimensions is straightforward, although physical representation of the higher dimensional relationship is no longer possible. For n products $n + 1$ mutually orthogonal coordinate axes are necessary. If consideration is still restricted to linear functions, the profit surface becomes a hyperplane. The remarks about the intersection of the profit surface in the three-dimensional case with cutting planes, also generalize to higher dimensions, yielding conventional profit-volume charts for one product with the volume of the other products held constant, and also conventional profit-volume charts for constant product mix.

### *Multi-Product Analysis as a Computer Program*

Although the multi-dimensional profit-volume concept is a logical approach to the multi-product situation, it cannot be expressed graphically and sacrifices a great deal in the way of simplicity of formulation. It can no longer be said that the nature and operation of the device are intelligible to the uninitiated. However, the traditional two-dimensional plots assuming constant product mix, or holding all but one product volume constant, can still be used for presentation but now with the explicit recognition that they are formulations derived from a master model which is logically more acceptable. Moreover, if the essence of break-even analysis is recognized to be a conception—the functional dependence of profit upon volume—rather than a particular gtaphical formulation, then the multi-dimensional profit-volume relationship can be used without apology.

The desirability of the traditional break-even chart lies in its ability to provide rapid estimates of the effect of proposed changes in volume, price or costs.

The same ability can be afforded a multi-dimensional analysis by building the relationship into a program for an automatic computer. The operation then is algebraic rather than geometric, but the same information is provided. It should be realized that, even in two-dimensional analysis, the work is generally algebraic, with the graphical representation serving as a means of presentation rather than the method of calculation. The introduction of automatic computing equipment in break-even analysis would permit the incorporation of refinements which have been heretofore impractical. For example, the restriction to linear cost and revenue functions could be relaxed. More complicated but more realistic functions involving non-linearity, at least at extreme volume levels, could be readily incorporated. The concept of diminishing returns, which has been lacking from traditional break-even analysis could be incorporated.

Moreover, it would not be necessary to impose a rigid classification of costs as either independent of volume or directly proportional to volume—fixed or variable in cost accounting terminology. Semi-variable costs could be admitted as such. It would also no longer be essential that the several cost and revenue functions be mutually independent. It would be possible to incorporate realistic capacity limits in the analysis itself, either by using prohibitively steep cost functions for volumes in excess of capacity or by means of programmed stops in the event that logical tests indicated that the requested volume was in excess of some capacity restriction. Conceivably it would even be possible for break-even analysis to acquire some dynamic attributes. A profit function could be used which depended upon the time derivative of volume as well as upon the volume level. Profit would then not necessarily be a single-valued function of volume. The profit associated with a given volume would depend upon whether that level was attained by an increase or a decrease and upon the rate of change as well as on the given level of volume—a more realistic reflection of the "stickiness" of costs than is provided by a static analysis.

### *Historical or Other Information as Appropriate*

It can be reasonably asked whether or not existing reporting and record-keeping procedures are capable of providing the fuel for so elaborate an engine. For the most part, the information required is the same as that used for conventional break-even analysis. It is simply used in a different and more powerful way. In some respects, notably the admission of semi-variable costs and the relaxation of the restriction to linear functions, the demands upon the accounting classification would be less stringent than for the conventional analysis. However, like the traditional break-even analysis, this multi-dimensional approach will undoubtedly rely heavily upon estimates of costs and revenues.

This dependence should be no cause for embarrassment. The use of historical accounting data is simply an estimating procedure based on the implicit assumption that the recent past is the best predictor of the near future. When this assumption is clearly not valid, an estimate which does not depend upon accounting data may be far better. Furthermore, when the traditional accounting classification of costs does not produce information appropriate to the problem at hand, a rough estimate of the relevant concept of costs is far preferable to a highly refined estimate of an irrelevant concept. Certainly, any attempt to incorporate such refinements as the introduction of a dynamic element in volume-mix-profit analysis will depend almost entirely on non-accounting estimates since the analyst is not going to find existing cost classifications which relate cost to the relevant parameters. Estimates produced by multiple regression analysis of basic accounting data may prove to be an important source of information for this type of study.

A serious attempt to produce a multi-dimensional model and analysis is a time-consuming and expensive task. On the surface, this might appear to proscribe its use in situations in which structural changes are frequent or relative factor prices vary markedly. But these are the very situations in which trial-and-error solutions are impossible and intuitive approaches are inadequate to deal with complex, dynamic problems. These are perhaps the very situations for which one cannot afford not to have the most powerful tools available. In addition, it seems certain that, as such analyses are made in greater detail and with greater realism than has been possible in the past, they will assume greater significance as instruments of control as well as of tactical profit planning.

### *The Beginnings of an Application*

The procedure described is not entirely conjecture. An analysis of the type described was recently performed as a part of a business study for a large, multi-product firm by an investigating team of which the author was a member. An automatic digital computer was employed, the structure of a multi-dimensional break-even chart being incorporated into a machine program. The firm manufactures a large number of similar products for two distinctly different markets. Several mutually dependent plants which supply each other with different components are involved and a fair number of different distribution channels are in use. The situation is further complicated by a serious problem of processing losses and re-work operations.

No attempt was made to include any dynamic element in the model or to depart drastically from linear relationships. There were enough problems as it

was. But the results which were achieved in this form were sufficiently encouraging to ensure that in further work some attempt will be made in the direction of such refinement. All of the required data was supplied by the existing records and developed by the company's own personnel. Some highly desirable information, particularly with regard to the impact of product mix on certain processing costs and capacity limitations, was not forthcoming—at least not within the stringent time limit imposed upon the study—and thus, in some respects, the model was less realistic than it was originally hoped that it might be.

The model saw considerable use, providing information on the impact of changes in volume, product mix, various cost parameters, processing losses, distribution pattern and channels, and allocation of production among the different plants. Although the profit function existed only in the form of a computer program and was not visible or graphically representable, the results of the various computations were plotted in various ways for graphical presentation. The study was judged highly successful and was completed in a relatively short period of time. Similar analyses should be within the means and abilities and to the decided advantage of many other firms.

# Keep Alert to Your Sales Mix

by GEORGE A. RAWCLIFFE

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*The often vital relationship of sales mix to profit, especially (but not solely) under conditions of changing volume, is the focus of attention in this article and of the graphic illustrations accompanying it. Supplied also is an extensive check-list of points to note in appraising the contemporary state of the company's product line.*

THERE IS A CURIOUS lack of sensitivity towards one's sales mix. What normally happens when the company's rate of earnings drops? When the decline is principally due to most obvious reasons (low sales, high scrap, low productivity, etc.) explanation of variances is routine. However, even when it has been specifically determined that the sales complexion has worsened, it is quite often shrugged off with, "It's the mix again." The effect of an unfavorable sales mixture is just too often treated with apathy or complete resignation. The critical point is that, even with a sales increase over budget, a drop in quality of mix can radically reduce profits or possibly throw the company into a loss.

It would appear that the average multi-product company has two fundamental requirements in this respect:

1. A simple, yet accurate, method of analyzing the sales mix.
2. A positive plan of attack to be applied in order to maintain maximum profits.

This paper will be devoted to a brief outline of how to prepare the indicator and suggestions for profit improvement when the sales mix is poor.

## Information Needed

To vividly portray and compare the relative value of sales, the sales mixture chart presented by Rautenstrauch & Villers in "Budgetary Control" (Funk and Wagnalls 1950) is recommended. This simple device reveals three pertinent areas of information.

1. What lines or product groups make the principal profit contribution? This is the "quality of sales" factor which is often overlooked.
2. The relative volume of each of these groups. The common delusion is the false worship of the total quantity of sales to the exclusion of the quality component.
3. A quick comparison basis with either previously determined standard performance or prior actual results.

As basic data, it is recommended that direct profit per product be used.

SALES MIXTURE SCHEDULE No. 1

| Product Group | % Average Direct Profit/ Sales | SALES Amount | SALES % | Direct Profit Col. 2 x Col. 3 |
|---|---|---|---|---|
| A | 75 | $ 9,000. | .9 | $ 6,700. |
| B | 70 | 12,000. | 1.2 | 8,400. |
| C | 65 | 94,000. | 9.4 | 61,000. |
| D | 60 | 173,000. | 17.3 | 103,700. |
| E | 55 | 261,000. | 26.1 | 143,500. |
| F | 50 | 182,000. | 18.2 | 91,000. |
| G | 45 | 105,000. | 10.5 | 47,200. |
| H | 40 | 123,000. | 12.3 | 49,200. |
| I | 35 | 20,000. | 2.0 | 7,000. |
| J | 30 | 21,000. | 2.1 | 6,200. |
| Total | | $1,000,000. | 100.0 | $523,900. |

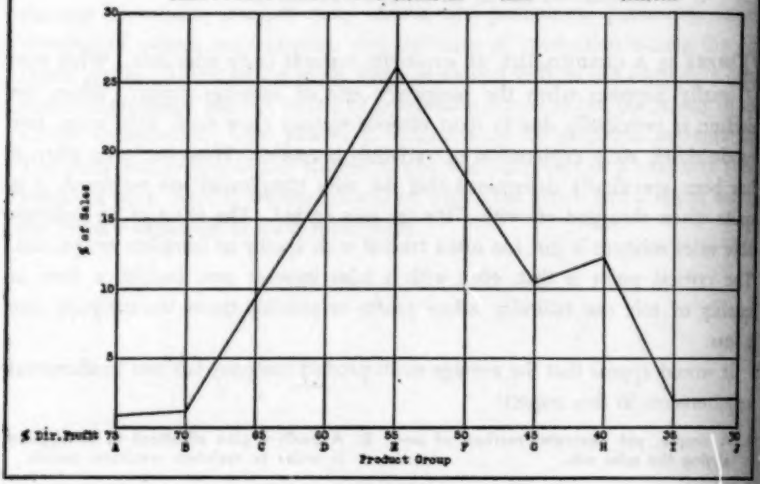


**EXHIBIT 1**

Direct profit equals selling price less direct cost. Direct cost is normally direct material plus direct labor. However, if there are any other cost elements, such as special packaging, special commissions, etc., the total cost of which rises and falls with the sales of a particular product, they too should be included in the direct costs. Next, one must establish logical product groups, setting up individual products as such if they are of sufficient magnitude to warrant independent treatment. By classifying products according to direct profit margin earned, data can be assembled as presented in Sales Mixture Schedule No. 1 (Exhibit 1).

A brief explanation is necessary for those who may feel that gross profit per product should provide comparable results. It will be observed that gross profits on a product basis are predicated on arbitrary allocations of fixed factory over-

SALES MIXTURE SCHEDULE No. 2

(Sales Increased . . . 10% Direct Profit Decreased . . . 1.5%)

| Product Group | % Average Direct Profit/ Sales | SALES Amount | SALES % | Col. 2 x Col. 3 |
|---|---|---|---|---|
| A | | | | |
| A | 75 | $ 4,000. | .4 | $ 3,000. |
| B | 70 | 5,200. | .5 | 3,700. |
| C | 65 | 27,700. | 2.5 | 18,000. |
| D | 60 | 91,500. | 8.3 | 55,000. |
| E | 55 | 169,000. | 15.4 | 93,000. |
| F | 50 | 260,000. | 23.6 | 130,000. |
| G | 45 | 182,000. | 16.5 | 82,000. |
| H | 40 | 155,000. | 14.1 | 62,000. |
| I | 35 | 164,000. | 14.9 | 57,000. |
| J | 30 | 41,500. | 3.8 | 12,300. |
| | Total . . . . . | $1,100,000. | 100.0 | $516,000. |
| Schedule 1 totals | | $1,000,000. | --- | $523,900. |
| Relation Chart 2/ Chart 1 | | 110% | --- | 98.5% |
| Net Gain or Loss | | 10% | | minus 1.5% |

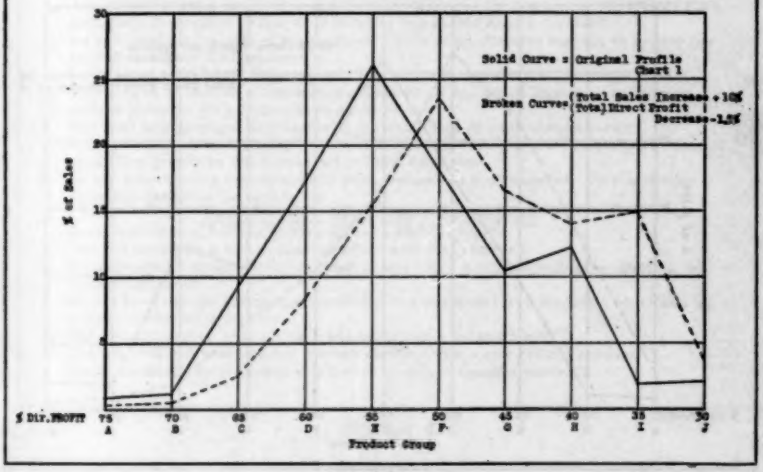
Solid Curve = Original Profile Chart 1
Broken Curves (Total Sales Increase +10%
(Total) Direct Profit Decrease-1.5%
% of Sales
$ DIR. PROFIT
75 70 65 60 55 50 45 40 35 30
A B C D E F G H I J
Product Group

**EXHIBIT 2**

head. When the sales of Product A change in relation to Product B, it would imply a complete re-allocation to create meaningful figures. Use of gross profit based on standard factory overhead rates (in turn based on an estimated sales mix) would introduce a "fuzziness" (positive mathematical error) each time the sales mix varied from standard. While total factory costs (including complete overhead absorption) are vital for pricing and control purposes, they are not suitable for our immediate objective. What we really need to know is what product or group of products gives us the most fruitful opportunity for profit.

### *Application of Data to the Charts*

On Exhibit 1 it will be observed that the horizontal axis represents the product

SALES MIXTURE SCHEDULE NO. 3

(Sales decreased . . . 10% Direct Profit Increased . . . 1. 1%)

| Product Group | % Average Direct Profit/ Sales | SALES Amount | SALES % | Direct Profit Col. 2 x Col. 3 |
|---|---|---|---|---|
| A | 75 | 24,000. | 2.4 | 18,000. |
| B | 70 | 105,000. | 11.7 | 73,500. |
| C | 65 | 191,000. | 21.2 | 124,200. |
| D | 60 | 240,000. | 26.7 | 144,000. |
| E | 55 | 150,000. | 16.7 | 82,500. |
| F | 50 | 94,000. | 10.4 | 47,000. |
| G | 45 | 60,000. | 6.7 | 27,000. |
| H | 40 | 20,000. | 2.2 | 8,000. |
| I | 35 | 10,000. | 1.1 | 3,500. |
| J | 30 | 6,000. | .7 | 1,800. |
| | Total . . . . . | $900,000. | 100.0 | $529,500. |
| Schedule 1 totals | | $1,000,000. | -- | $523,900. |
| Relation Chart 1/ Chart 1 | | 90% | -- | 101.1% |
| Net Gain or Loss | | minus 10% | -- | plus 1.1% |

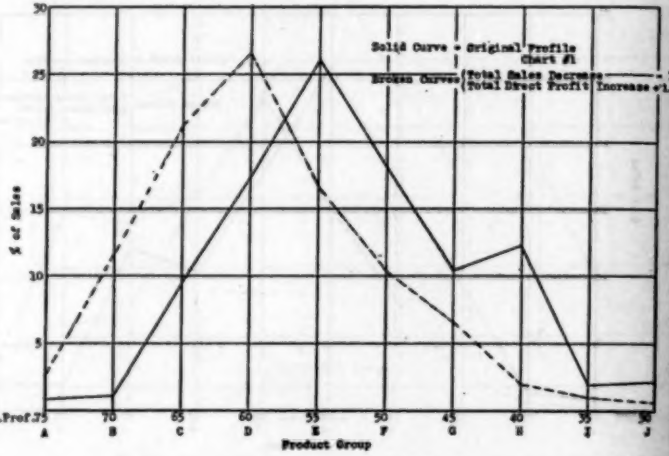
Solid Curve = Original Profile Chart #1
Broken Curve (Total Sales Decrease ——— 10%
(Total Direct Profit Increase + 1.1%
% of Sales
30
25
20
15
10
5
% Dir.Prof. 75 70 65 60 55 50 45 40 35 30
A B C D E F G H I J
Product Group

**EXHIBIT 3**

group and the vertical axis represents the per cent of sales. The percentage of total sales for each product group is plotted. The curve thus obtained delineates the character of the sales mix. Certain features should be emphasized. A sales mix chart is, in reality, a profile of the quality of sales for any given period. The sales mix chart bears no relationship to volume. Increased total sales reflecting the same curve, will, of course, create higher profits. Similarly, decreased total sales of corresponding sales mix characteristics will reduce profits. Even if the peak of the chart moves to the right (area of lower direct profit margin), the same or better total profit will result if total sales are sufficiently

POINTS TO REVIEW IN CONSIDERING PRODUCT-LINE DEVELOPMENT

Production Facilities and Management

1. Do you have obsolete facilities? Has a radical improvement in machine design been a factor in your high costs?
2. Are your manufacturing methods obsolete? Have you failed to adopt the current best production technique?
3. Do you manufacture from the cheapest raw material?
4. Are you up-to-date on your make-or-buy decisions?
5. If capital for expansion is not available, have you considered leased equipment? This may permit prompt market entry with attractive developments presently languishing in your laboratory or pilot plant. .
6. Are your present supply sources thoroughly reliable? Do you occasionally suffer from shortages or inferior material?
7. Do you have excess production capacity? Is your sales department aware of this?
8. Do you have an excess of certain specialized technicians? Can this surplus know-how be used to good advantage? How about related products?
9. Is your management competitively efficient? Industry-wise, are your profits in line?

Sales Strategy - Current Products

1. Are you restricting yourself to one market where two or more would distribute your risk more favorably? Also, is it possible you should drop a market?
2. Do you promote the sale of by-products? This is an effective manner to reduce the cost of your principal products.
3. Do you avoid product obsolescence? Are you still "pushing" horse whips?
4. Do you have an excess of marketing capacity? If so, added lines of substitute or related products may yield additional income.
5. Are your new products satisfactorily meeting those of your competitors?
6. Are you sensitive to changing economic factors or buying habits? Examples are population growth or do-it-yourself product demands.
7. Do you keep closely informed as to your customer requirements? Do you modify promptly when it is required.

Sales Strategy - New Product Opportunities

1. Does your normal factory waste suggest a new product?
2. Can you introduce a new product to offset seasonal slumps?
3. If you produce certain items for internal use only, could you well offer them to the trade in general?
4. Do you have special knowledge pertaining to a particular raw material which can be applied to related products?
5. Can you press your prestige or trade name into a related field?
6. Can you well use your present market contacts with a new related product?
7. Should research be promoted at a faster pace on a specific product?

**EXHIBIT 4**

increased. Correspondingly, if the peak of the chart moves to the left (area of higher direct profit margin), there may still be equal or improved total profits.

On Exhibit 2, it is useful to note what happens when 10 per cent additional sales are obtained and the product-mix veers to the right (represented by the broken line.) In this particular instance, the total dollars of direct profit declined 1.5 per cent while sales climbed 10 per cent above their previous level. Does this jar a bit?

Does this force recollection of a similar experience in your company, possibly after your sales department had urged a price reduction "to capture a larger share of the market?" The average firm cannot afford many of these hollow victories.

A look at Exhibit 3 indicates where better things have happened. This time sales dropped 10 per cent but the sales pattern (broken line) shifted to the left. Here we simultaneously suffer a sales decline of 10 per cent, along with a direct profit improvement of 1.1 per cent. Without the benefit of sales mix data, this type of period might be a little difficult to explain. Consider also the potent revelations which can be disclosed by sales mix charts specialized in the following channels:

1. By salesman.
2. By territories.
3. By type of sales—e.g.
   Domestic vs. export
   Direct sales vs. commission agents
   Distributors vs. industrial consumers
4. By comparison with a standard chart representing the characteristics of the sales forecast.

## Courses of Action Suggested

When the general quality of sales, revealed by a review of the profile of the chart, is poor in relation to standard or prior performance, several alternatives are available. Note that the usual signal of depreciated average profitability of sales is simply that the peak of chart has drifted from the left to the right, i.e., towards the area of lower direct profit. Possible courses of action are:

1. Proceed to reduce direct costs. If this recommendation appears somewhat arbitrary, note that high-lighting these low margin items, in itself, usually inspires some action in this direction.
2. Determine whether or not prices can be advanced.
3. Increase sales, with greatest emphasis on high-direct-profit-margin items.
4. Take steps to introduce
   a. A more profitable substitute.
   b. A more profitable new product or line.
5. Drop the offending product group as soon as feasible.

These are specific remedies but I prefer not to close this article without emphasis on a still broader view. In order to pique the imagination as to methods for profit improvement, questions are offered in Exhibit 4 in three main categories. Ideas for maximization of profits from both present product mix and from new fields are included. It will be readily observed that favorable sales mix is the end product of efficient management in all areas of responsibility. Does it not shake "your very timbers" then, to note how deterioration in this area wipes out profits? Constant self-appraisal by the factors recited above is proposed as a means to check performance. To paraphrase a maxim "eternal vigilance is the price of a profitable sales mix."

# The Small Order Problem In Distribution Cost Control

by CURTIS J. BLECKE

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*Described and illustrated in this paper are procedures for analyzing orders and costs to disclose categories for which relatively fixed processing costs in plant and office suggest that losses are being sustained. Also illustrated are unit standard cost records similarly revealing. Attention is given to factory costs which may not always be classified as distribution costs.*

THE FIELD OF DISTRIBUTION cost accounting is comparatively undeveloped and affords cost accountants the opportunity to provide a management tool designed to reduce marketing costs per unit. Analyses of distribution costs lead to improved profits through adjusted selling prices or dropping of unprofitable business or possibly by lowering selling prices on high profit business when it results in greater volume and strengthened competitive position.

This paper deals with one part of the distribution cost control field. The broader area includes channels of distribution, territories and salesmen, products, physical distribution, etc. Here we are concerned with problems inherent in small volume customers and small orders as they affect manufacturing companies. The small order problem is of particular significance in two types of manufacturing plants or a combination of the two. In either case, there will be items ordered in small quantities which cannot be carried in stock and, hence, must be manufactured in small runs. The types are:

1. Plants which manufacture highly diversified types of products and product lines.
2. Plants which manufacture a line of products which are made to individual customer's designs and specifications.

## Distribution Costs and the Small-Order Problem

In general, we might say that there are two basic kinds of costs, the cost to make the product and the cost to get it into the customer's hands. Costs such as salesmen's salaries, commissions, and bonuses, travel and entertainment expense, sales conventions, branch sales office expense, delivery expense, supplementary warehouses, sales promotion and advertising are clean-cut examples of distribution cost. In the factory cost bands however, there are distribution costs

ANALYSIS - ORDER SIZE VS. SALES VOLUME

| Size of Order | No. of Orders | % of Total Orders | Sales Value | % of Total Sales | Ave. Sales Value/Order |
|---|---|---|---|---|---|
| Under $10 | 477 | 17.2 | $ 2,599 | .3 | 5.45 |
| $10 to $25 | 462 | 16.8 | 8,607 | 1.0 | 18.63 |
| $25 to $50 | 558 | 20.3 | 21,059 | 2.4 | 37.74 |
| $50 to $100 | 388 | 14.1 | 29,798 | 3.4 | 76.80 |
| $100 to $200 | 151 | 5.5 | 23,450 | 2.7 | 155.30 |
| $200 to $500 | 156 | 5.7 | 50,039 | 5.7 | 320.76 |
| $500 to $1,000 | 209 | 7.6 | 163,559 | 18.7 | 782.58 |
| Over $1,000 | 352 | 12.8 | 576,588 | 65.8 | 1,638.03 |
| | 2,753 | 100.0 | $875,699 | 100.0 | $ 318.09 |

**EXHIBIT 1**

not so clearly marked. Such functions as job change cost, production scheduling, order processing, billing, price estimating, warehousing and shipping are considered as distribution costs by some authorities. In most companies these costs are presently handled as plant overhead or fixed costs.

The small order penalty in cost per unit is obvious. In analyzing the profitability or unprofitability of customers, product lines, products, sales territories, salesmen, factories, divisions, geographic areas, etc., it seems that small volume customers and small orders invariably appear as a major cause of higher distribution and manufacturing costs than the selling price or even the overhead absorption contribution can recover. This is mainly because many expenses are more closely related to the number of orders and customers rather than to the sales dollar volume. It is not uncommon to find numerous orders for which the paperwork cost alone was greater than the sales value of the billing. In most

SALES ANALYSIS - NO. CUSTOMERS VS. ANNUAL VOLUME

| Sales Volume Category | No. of Customers | Sales Volume | Avg. Sales $ per Customer | % Customers to Total | % Volume to Total |
|---|---|---|---|---|---|
| Under $4,000 | 310 | $ 353,324 | $ 1,140 | 79.7 | 24.8 |
| $4,000 to $5,000 | 16 | 69,392 | 4,337 | 4.1 | 4.8 |
| $5,000 to $7,500 | 24 | 149,431 | 6,226 | 6.2 | 10.4 |
| $7,500 to $10,000 | 11 | 98,898 | 8,991 | 2.8 | 6.9 |
| $10,000 to $15,000 | 13 | 156,036 | 12,003 | 3.3 | 10.9 |
| $15,000 to $25,000 | 9 | 177,036 | 19,671 | 2.3 | 12.4 |
| $25,000 to $50,000 | 5 | 194,028 | 38,806 | 1.3 | 13.5 |
| Over $50,000 | 1 | 232,779 | 232,779 | .3 | 16.3 |
| | 389 | $1,430,924 | $ 3,678 | 100.0 | 100.0 |

**EXHIBIT 2**

cases, it takes just as much clerical time and forms to process a $5 order as a $5,000 order. It also takes just as long and costs just as much to change dies or set up a line of machines to run a 5-piece job as a 5,000-piece job.

However, if it is an accepted fact that small orders and small volume customers are an obvious cause of high distribution costs in many manufacturing companies, it is equally an accepted fact that small order losses cannot be entirely eliminated, either by raising prices or dropping unprofitable customers. The important thing is that management be informed of which types of products and which sizes of customers and orders are unprofitable. Further, management should be informed as to what elements of costs are involved, to what degree, and what remedial action, if any, could be taken. The identification of order size to customers and products is of major importance in such an analysis.

### *Analysis Procedure*

A common sense approach should be employed in making this type of analysis and the technique or procedure followed should be as simple as possible, at least for the first general survey. After the initial study, use of statistical formulas to determine economic lot size might be indicated. Also, in companies in which electronic data processing is employed, the separation between manufacturing costs and distribution costs might be incorporated in the computer program and special analyses readily obtained. This could be done manually in companies where electronic equipment is not economical. However, for the first step, it is suggested that a simple tabulation be made of orders or invoices by size-of-order category. A sample of what this might look like is depicted in Exhibit 1. From this exhibit, the following information is immediately noted:

1. 84.5% of the total sales volume is accounted for by only 20.4% of the number of orders.
2. Conversely, 34.0% of the total number of orders accounts for only 1.3% of the total sales volume.
3. The average sales value of 17.2% of the orders is only $5.45 each.
4. The average sales value of 12.8% of the orders is $1,638.03.

The next step might be to determine the total cost per month of distribution costs which could be considered in direct ratio to the number of orders handled. This would include the marginal or escapable portion of warehouse and shipping cost, job change cost, order processing department, scheduling department, billing department, price estimating department, etc. This total cost figure could then be divided by the total number of orders processed per month. For illustration, let us say that this cost totals $40,000 per month which, divided by 2,753 orders, averages $14.53 per order for the factory portion of distribution

**PRICE ESTIMATING FORM**

ORDER QUANTITY 10,000 STARTING QUANTITY 12,700

| OPER. NO. | OPERATION DESCRIPTION | STANDARD PRODUCTION PER HOUR | JOB CHANGE COST | | DIRECT LABOR COST PER HOUR | DIRECT LABOR COST PER C PCS. | MACH. & E.H. COST PER HOUR | MACH. & E.H. COST PER C PCS. | SETUP, TOOLING & ENGR. COST PER ORDER | SETUP, TOOLING & ENGR. COST PER C PCS. | MATERIAL COST PER C PCS. | ESTIMATED SCRAP % | ESTIMATED SCRAP COST PER C PCS. | TOTAL COST PER C PCS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | HOURS | $ PER HOUR | | | | | | | | | | |
| - | MATERIAL | | | | | | | | 25.00 | .25 | 3.00 | | | 3.25 |
| A | # 1 | 1000 | 5 | 100.00 | 1.00 | .10 | 20.00 | 2.00 | | | | 5 | .12 | 7.22 |
| B | # 2 | 500 | 2 | 36.00 | .36 | .525 | 1.05 | 18.00 | 3.60 | | | 10 | .80 | 13.03 |
| C | # 3 | 750 | 1 | 16.00 | .16 | 3.50 | .47 | 16.00 | 2.13 | | | 2 | .27 | 16.06 |
| D | # 4 PACK | 750 | | | | 1.50 | .20 | 12.00 | 1.60 | | 2.00 | 3 | .50 | 20.36 |
| | TOTAL MANUFACTURING COST | | | | 1.52 | | 2.52 | | 9.33 | .25 | 5.00 | | 1.94 | 20.36 |
| | GENERAL SELLING EXPENSE | | | | | | | | | | | 15 % | COST PER 100 .291 | 3.05 |
| | GENERAL ADMINISTRATIVE OVERHEAD | | | | | | | | | | | 10 % | | 2.04 |
| | TOTAL STANDARD COST PER 100 PCS. | | | | | | | | | | | | | 25.45 |
| | SUGGESTED SELLING PRICE PER 100 PCS. | | | | | | | | | | | | | 32.00 |

ORDER QUANTITY 500 STARTING QUANTITY 615

| - | MATERIAL | | | | | | | | 25.00 | 5.00 | 3.00 | | | 8.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | # 1 | 1000 | 5 | 100.00 | 20.00 | 9.00 | .10 | 20.00 | 2.00 | | | 5 | .12 | 51.22 |
| B | # 2 | 500 | 2 | 36.00 | 7.20 | 5.25 | 1.05 | 18.00 | 3.60 | | | 10 | 3.97 | 46.54 |
| C | # 3 | 750 | 1 | 16.00 | 3.20 | 3.50 | .47 | 16.00 | 2.13 | | | 2 | .95 | 53.49 |
| D | # 4 PACK | 750 | | | | 1.50 | .20 | 12.00 | 1.60 | | 2.00 | 3 | 1.45 | 58.74 |
| | TOTAL MANUFACTURING COST | | | | 30.40 | | 2.52 | | 9.33 | 5.00 | 5.00 | | 6.49 | 58.74 |
| | GENERAL SELLING EXPENSE | | | | | | | | | | | 25% COST PER 100 | COST PER 100 1.637 | 14.68 |
| | GENERAL ADMINISTRATIVE OVERHEAD | | | | | | | | | | | 15% | | 8.81 |
| | TOTAL STANDARD COST PER 100 PCS. | | | | | | | | | | | 10 % | | 5.87 |
| | SUGGESTED SELLING PRICE PER 100 PCS | | | | | | | | | | | | | 73.42 |
| | | | | | | | | | | | | | | 92.00 |

EXHIBIT 3

cost alone. It is readily apparent, then, that orders in the size category which average $5.45 are unprofitable.

A similar anaylsis can be made for the number of customers versus annual sales volume broken down by sales volume categories. Exhibit 2 illustrates what this might look like. Here we see that 20 per cent of the customers contribute 75 per cent of the sales volume. In utilizing this analysis, it might be determined

what the total cost per month is of distribution costs which relate to customers. This would include the marginal or escapable portion of branch office expense, salesmen's remuneration, travel and entertainment expense, and all other direct sales solicitation expense. In this situation, however, rather than determine an average cost per customer, it might be more accurate to allocate the sales solicitation expense to the specific customers.

At this point, if there is evidence that a small order problem exists, the analyses as illustrated in Exhibit 1 and 2 might be expanded to include a breakdown of sales by product line. If we have a profit and loss statement by product line, the three types of data might then be correlated, so that the direction of further analysis can be determined.

### *Keeping Book on Unit Cost Differences of Small Orders*

The analyses as depicted have pointed out that a large proportion of the number of customers and orders bring in only a minor proportion of the total sales volume. This would not necessarily mean that this portion of the business is unprofitable. However, distribution costs generally are related to the number of customers and orders rather than to the actual dollar sales. In many companies, job change cost and other factory distribution expense is handled as fixed or overhead cost and allocated to the direct or variable costs on the basis of direct labor dollars, direct labor hours, machine operating hours, etc. This results in the standard cost of small orders being understated and the cost of large orders overstated. Exhibit 3 graphically illustrates this point.

Its two parts are a facsimile of a standard cost card or price estimating form and are exactly the same, except that one shows an order quantity of 10,000 items and the other 500. It will be noted that, in both cases, the direct labor cost, the machine and overhead cost, and the material cost are exactly the same per unit or 100 pieces. The job change cost, the factory distribution cost and the spoilage cost are much higher per C pieces for the small-quantity order than the large-quantity order. Thus, the method of calculating these standard costs shows that the small-order manufacturing cost is almost three times as much as the same item with a substantial order quantity. This method reflects the actual cost experience in the plant. However, if the job change cost and the factory distribution expense are included with the remainder of the machine and overhead cost and prorated on the basis of pieces produced per hour, these facts are hidden and the same total manufacturing cost per unit figure would apply, regardless of the order or run size.

Extending this disproportionate spreading of distribution costs to include

customers, territories and products could conceivably result in sales effort being concentrated on unprofitable customers and perhaps in the company being priced out of the more desirable business because the standard costs are overstated and the possibility of lowering selling prices to meet competition and to increase volume is hidden by misleading figures.

The type of standard cost or cost estimate illustrated in Exhibit 3 should support Robinson-Patman Act requirements in establishing realistic quantity differentials. Actually, if the selling prices applied to small orders are adequate to recover the cost penalties inherent in the small order, there is no reason why this type of business should not be as desirable as larger orders. Some large companies, which are accustomed to negotiate over a few cents differential per unit on items they purchase by the carload, expect to pay a premium on a small order.

### *Selling Expense*

Selling expense covers all other distribution costs not incurred under the manufacturing plant roof. It includes general selling expense, branch sales office, salesmen, advertising, etc. Here again, it has been common practice in many companies to find the relationship of total manufacturing cost to total selling expense for the whole company and apply it as a flat percentage to the individual product cost estimate regardless of size of order, customer, product line, territory, etc. This practice could very well result in profitable sales divisions, manufacturing divisions and product lines subsidizing unprofitable sections of the business, all without management being aware of the true facts.

It is believed that better distribution cost control will result in decreased costs and increased profits for industry and, at the same time, reduce the ultimate cost of goods to the consumer. The role of the cost accountant in this effort is one of responsibility for making progress in presentation of the facts

# It's Time For Time Standards For Clerical Labor

by THOMAS C. PITNEY

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*A forthright contention that management's scientific techniques for direct labor cost control may now appropriately, even necessarily, be applied to labor standards in clerical and other indirect labor operations is implicit in this article in which the author presents the case for these means of control, outlines procedures involved, and illustrates representative forms embodying mechanics and results.*

MANAGEMENT'S INTEREST in improving the efficiency of office operations has not been confined solely to automation. More and more, particularly in the last five years, there has been a growing awareness of the fact that effective controls over the performance or output of office and other indirect workers are lacking in almost all businesses. Perhaps it would be fairer to state that the knowledge of the lack of controls has existed for some time, but the significance of the situation only recently has been brought to light by the tremendous growth of the indirect labor work force. In any event, there is an increasing tendency among thoughtful business managers to attempt to apply modern, scientific concepts in improving their controls over the performance of indirect workers.

Efforts to improve such controls are often described as "clerical work measurement programs," but, in most cases, controls are extended beyond the range of truly office, or clerical, occupations to include all types of indirect workers. The modern techniques applied in improving controls over indirect workers' performance vary considerably. In almost all cases, however, controls are based on indirect labor standards, similar in many respects to shop standards used for many years in controlling direct labor costs. The purpose of this article is to briefly illustrate a typical approach to establishing and operating an indirect labor control system based on the application of standards.

## What to Expect from an Indirect Labor Standards Program

The following major considerations arise in evaluating the practicability of using standards to control indirect labor costs:

1. What is the likelihood of actually reducing costs through such standards? Undoubtedly, additional costs are involved in establishing a standard system. Will

savings resulting from application of these standards exceed the costs of installing the system?

2. What will be the effect on employee morale? Will application of standards result in constant turnover or poor employee attitude?
3. Can standards be economically maintained to control future operations? Since methods and procedures are changed frequently, will the expense of revising standards overcome their economic usefulness? Or worse, might the existence of standards discourage change and tend to prevent improvement in operation?

Studies conducted by a number of organizations specializing in this field indicate that indirect workers typically operate at about 60 per cent of what could be expected as "normal" output. Further, experts have indicated, and actual applications have demonstrated, that output can be raised to normal (or 100 per cent) through application of a carefully planned and administered indirect standards program. Even greater improvement is possible by combining incentives with the standards program. Installation costs vary principally with the degree of accuracy deemed necessary in the standards. However, considering the room for improvement in performance of indirect workers, savings almost invariably exceed costs of installing the system.

Naturally, the application of indirect operations will have a major effect on employee attitude. To avoid morale problems, many companies, in applying this type of program, follow the practice of absorbing reductions, through normal turnover and assuring employees of this fact. In almost all cases, it has been found beneficial from a morale standpoint to explain the program completely to employees. If this is not done, employees will draw their own conclusions, and the results might be disastrous.

The costs of an indirect standards program may be divided into three major classifications: (1) the costs of establishing standards and production reporting and timekeeping systems, (2) the costs of revising standards to conform with procedural changes in measured organizations and (3) the clerical costs of accumulating and generating data to be used in reports indicating the comparison of actual performance with standards. While the installation costs of establishing standards are non-recurring, maintenance of reporting costs continue indefinitely. In evaluating the economic justification for an indirect standards program, it is difficult to separate the three elements of cost. It is doubtful that significant savings could be realized in any instance where the program was undertaken on a "one-shot" basis which does not provide continuous maintenance and evaluation of results. However, since installation costs in a given organizational unit are normally much greater than combined annual maintenance and reporting costs, if there are any savings at all in the installation period, they should be even more impressive later.

The possibilities of the standards program stifling improvements in office

procedures depend on the basic maintenance policies to be followed. If a policy were adopted under which it was difficult to obtain revisions to standards and, at the same time, necessary to maintain standards coverage, the program might tend to discourage improvements in procedures. Under a realistic maintenance policy, however, the possibilities of this effect are remote. Inasmuch as standards provide a sound basis for determining the relative costs of alternative methods and procedures, the standards program would tend to obviate procedural changes of marginal value.

### Policies for an Indirect Labor Standards Program

Most successful indirect standards programs are individually tailored to the requirements of a particular business. For this reason, the various steps in the installation and operational phases can be discussed only broadly in an article of this nature. First of all, let us consider the development of the basic policies to be followed in the program. Since standards programs involve comparisons of results of organizations, and perhaps of individuals, as a basis for motivating improvements, consistency of application is essential. Therefore, basic policies with respect to the degree of accuracy in standards must be established prior to actual installation. Although it is possible to defer decisions on some of the other aspects of the program until installation begins, best results are obtainable when the entire program is defined prior to installation. Some of the more important subjects to be considered from a policy standpoint are dealt with in the following paragraphs.

Depending on circumstances, measurement may indicate results of performance of individuals or only of organizational units. The type and degree of accuracy required in standards would vary in either case. If incentives are to be considered, either immediately or in the future, much greater accuracy in standards would be required. Evaluation of factors such as these would indicate the type of standard desirable under the circumstances and the most desirable method for establishing the standards. Measurement techniques include time study, past performance, work sampling, predetermined time values and others.

The responsibility for administering the program should be established in advance. In some instances, responsibility is shared by a number of units within a company. The best working arrangement depends on circumstances within the particular company. Since the general field of indirect labor standards is complex and relatively new, some companies engage outside consultants to assist in various phases of the programs. If this is the case, the capacity and responsibilities of the consultants should be established in advance. In either case and

ANALYSIS OF DEPARTMENTS CONSIDERED FOR MEASUREMENT

| Department | Personnel | | | Total measurable hours | Expected coverage | | Equivalent measurable employees |
|---|---|---|---|---|---|---|---|
| | Total | Staff | Measurable | | % | Measurable hrs. | |
| Payroll | 18 | 2 | 16 | 640 | 74 | 472.5 | 11.8 |
| Accounts Payable | 12 | 1 | 11 | 440 | 75 | 328.5 | 8.2 |
| Accounts Receivable | 14.4 | 1 | 13.4 | 535 | 76 | 409 | 10.2 |
| Tabulating Process | 24 | 5 | 19 | 760 | 65 | 497 | 12.5 |
| Tabulating Keypunch | 12 | 1 | 11 | 440 | 85 | 374 | 9.4 |
| Order | 23 | 3 | 20 | 800 | 80 | 641 | 16.0 |
| Billing | 27 | 2 | 25 | 1,000 | 83 | 830 | 20.8 |
| Contracts | 6 | 1 | 5 | 200 | 76 | 153 | 3.8 |
| Mail and File | 14.5 | 1 | 13.5 | 540 | 78 | 420 | 10.5 |
| Stenographic Pool | 5 | 1 | 4 | 160 | 80 | 128 | 3.2 |
| | 155.9 | 18 | 137.9 | 5,515 | 77 | 4,253 | 106.4 |

**EXHIBIT 1**

needless to say, complete management acceptance of the program is a prerequisite to success. Acceptance on the part of line supervisors and employees is equally important. A carefully planned orientation program for all levels of management and for employees is invaluable in securing necessary acceptance and support.

In many cases, work simplification, or methods improvement, is tied in with the standards program. In other words, it is decided that, in the course of the analyses required to establish standards, recommendations to improve methods and procedures will be made.

### Setting the Standards

Once basic policies are established, the next question is where to begin the installation of the program. Installation can proceed on a department-by-department basis without considering which areas offer the best possibilities for savings. On the other hand, some companies have found it useful to analyze their various organizations to determine the most likely areas to produce savings, as the logical starting point for the program. A typical analysis indicates

**TASK LIST**

| Name: | Title: | Classification: |
|---|---|---|
| John Martin | Tab Operator | |

| Department: | Section: | Supervisor: | Date: |
|---|---|---|---|
| Tab Payroll | Machine | Jim Jones | 10-15-56 |

| Task no. | Description | Hours Worked M | T | W | T | F | Total |
|---|---|---|---|---|---|---|---|
| 1 | IBM payroll machine operation computations | 6 | 7 | 6 | 5 | 7 | 31 |
| 2 | IBM payroll machine operation distributions | 1 | | 1 | 2 | | 4 |
| 3 | Proving "time" received from plants | | 1 | | | 1 | 2 |
| 4 | Clearing irregularities in payroll time reporting | 1 | | | | | 1 |
| 5 | Miscellaneous reports | | | 1 | 1 | | 2 |
| | Total | 8 | 8 | 8 | 8 | 8 | 40 |

**EXHIBIT 2**

the approximate number of hours to be considered for measurement in various departments (Exhibit 1).

Assuming that performance was at approximately the same level of efficiency in each of the departments listed, the analysis indicates the relative possibilities for savings in each department and the overall possibility for the entire organization. On the further assumption that performance was at 60 per cent of normal and that, through application of standards, it could be raised to 100 per cent, the work performed by the indicated 106.4 measurable employees could be handled by approximately 64 employees operating at 100 per cent efficiency. Either based on analysis or merely by selecting an organizational unit at random, the next task is to begin the actual installation in a specific organization.

The first step in the installation should be to explain fully the program to supervisors and employees as a means of soliciting their support. Next, the work performed should be analyzed and condensed into specific operations with which units of production can be associated. For instance, in an accounts payable organization, one operation would be to verify the arithmetical accuracy of an invoice and the unit of production would be one invoice. In many instances, operations are associated with assigned numbers and employees are required to account for hours worked by identifying the operation number describing the work performed. As indicated in the Task List (Exhibit 2), this provides the standards analysts with the names of the employees performing certain operations and the number of hours per week devoted to each operation.

Inasmuch as it is not practicable to review all of the techniques used in estab-

DAILY TIME AND PRODUCTION REPORT

| Time | | Elapsed time | | Standard production | | Std. hrs. | Std. hrs. |
|---|---|---|---|---|---|---|---|
| Start | Stop | Other | On Standard | code | quantity | per unit | earned |
| 800 | 930 | | 150 | 1 | 600 | .0022 | 1.32 |
| 930 | 1200 | | 250 | 3 | 250 | .0100 | 2.50 |
| 100 | 200 | | 100 | 5 | 100 | .0150 | 1.50 |
| 200 | 500 | 300 | | Machine down | | | |
| | Total | 300 | 500 | | | Total | 5.32 |
| Date worked: 11/9/56 | | Employee: John Clark | | Date: 11/10/56 | | Efficiency % | 106.4 |

**EXHIBIT 3**

lishing standards, here we will describe the time study technique used in establishing standards to indicate individual employee (rather than group) performance results. On the basis of information indicated in task lists, the standards analyst would select an operation for which a standard is to be established and determine the names of the employees performing the operation. In making the time study, the analyst attempts to select clerks or operators performing, in his opinion, at a pace near normal or 100 per cent. The operation performed is broken down into measurable units of work called "elements." Using a stop watch, the analyst records, in hundredths of a minute, the exact time taken to complete each element. He then applies a leveling factor (performance rating) and, by the process of averaging or selection, he scales all readings to a normal time. After arriving at a "norm," he adds an allowance to compensate for rest periods, fatigue and delays, to arrive at the final standard time for performing the operation.

One of the most important considerations in establishing the standard is the application of the leveling factor to the unit times in arriving at normal times. This implies that the standards analyst has a predetermined concept of a normal pace and that all actual times, as indicated by studies, are adjusted to the same concept of normal. Although the ability to level is based on judgment, analysts are carefully trained in leveling, or performance rating, to insure that all standards are based on a consistent and reasonable concept of normal. Continuing with time studies, standards would be established for all measurable operations performed in the department studied.

### *Operation of the System*

When all standards are established, employees are instructed in a method of accounting for time and production on especially designed forms provided for

MANAGEMENT ANALYSIS REPORT - ACCOUNTS PAYABLE DEPARTMENT

| Period | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Week ended | 11/15 | 11/22 | 11/29 | 12/6 | 12/13 | 12/20 | 12/27 | 1/3 | 1/10 |
| Number of employees | | | | | | | | | |
| Staff (not measured) | 8 | 9 | 9 | 7 | 7 | 7 | 7 | 7 | 7 |
| Measured | 29 | 26 | 26 | 26 | 25 | 25 | 24 | 24 | 23 |
| Total | 37 | 35 | 35 | 33 | 32 | 32 | 31 | 31 | 30 |
| Hours worked (measured employees) | | | | | | | | | |
| Lost time hours | 20 | 10 | 40 | 35 | 30 | 35 | 30 | 40 | 60 |
| Unmeasured hours | 40 | 30 | 20 | 15 | 10 | 15 | 10 | 10 | 10 |
| Hours on standard | 1,100 | 1,000 | 980 | 990 | 960 | 950 | 920 | 910 | 850 |
| Standard hours produced | | | | | | | | | |
| Hours earned | 846 | 863 | 871 | 830 | 853 | 847 | 862 | 840 | 848 |
| Measurement results | | | | | | | | | |
| %Efficiency | 77 | 86 | 89 | 84 | 89 | 89 | 94 | 92 | 100 |
| % Utilization | 76 | 85 | 85 | 81 | 86 | 86 | 91 | 88 | 93 |

**EXHIBIT 4**

this purpose. Exhibit 3 is a typical form used to record this data. Employees account for elapsed time worked on a particular standard operation by indicating a code number assigned to the standard. Quantity of production is also indentified with the standard code number. The quantities of production are extended by standard time to arrive at earned hours. The relationship of earned hours to hours on standard indicates the efficiency for the day, in this case 106.4 per cent. By summarizing the results of all of the individuals in an organizational unit, a performance report for the entire unit may be prepared. Exhibit 4 is a fairly typical example of a performance report for a department.

Hours worked by measured employees are broken down into lost time, unmeasured hours and hours on standard. Lost time hours are those hours lost from a productive standpoint due to machines failure, lack of work, illness and other reasons. Unmeasured hours are hours spent in performing jobs for which standards were not established. Hours on standard are the hours spent in performing operations for which standards are established. Hours earned are calculated by multiplying production quantities by standard time. For example, the hours earned indicated in Exhibit 4 correspond to the 5.32 hours earned as indicated in Exhibit 3. The relationship of hours earned and hours on standard is indicated by the percentage of efficiency. The utilization percentage indicated this same relationship reduced by the effect of the lost-time hours. Efficiency indicates the relative pace at which standard jobs were performed.

Utilization indicates the relative effectiveness of the total hours worked, considering both pace and the effect of lost productive time.

Exhibit 4 serves to illustrate the use of standards to reduce indirect labor costs. Since hours earned remained fairly constant during the entire period covered by the report, it is obvious that work load does not vary to any significant degree in this department. In the week ended November 15, 29 measured employees worked 1,000 hours on standard to produce 846 standard hours of work. In the week ended January 7, the number of measured employees has been reduced to 23, who work 850 hours on standard to produce 848 standard hours of work. An increase in efficiency from 77 to 100 per cent, in this case, made it possible to reduce the work force by six employees while work load remained constant. Considering annual payroll and related costs at $4,000 per employee, the increase in efficiency resulted in annual savings of $24,000.

The increase in efficiency, however, did not result merely from the establishment of standards and the publishing of performance reports. In this case, or in any other instance in which standards are used as a basis for improving performance, supervisors must carefully review the performance of individual employees and assign work loads to obtain maximum utilization of available time. The supervisors' job is to provide each employee with sufficient work on the basis of standards so that maximum performance is attainable. It is also their responsibility to encourage poor performers to improve work pace.

### On a Par With Factory Standards

As previously mentioned, the control of indirect labor costs through application of standards is a relatively new application of a known concept. It is a fresh approach to a problem assuming greater importance in almost every business. Though installing and maintaining an indirect labor standards program involves a considerable amount of effort, results clearly indicate the practicability of this approach to cost control. It is the author's belief that the future will witness an even greater interest in this field and that this means of indirect labor control will ultimately be as frequently encountered in business enterprises as direct labor standards application.

# How the Accountant Can Be More Help to the Production Department

by WALTER B. SCOTT

*Vice-President of Manufacturing, Motorola, Inc., Chicago, Illinois*

*The accountant as an individual, the reports he prepares, and his opportunities for resourcefulness in helping guide operations in a profitable direction come in for the scrutiny of the present author who has supplemented his experience-based opinions, here expressed, by obtaining confirmation from other production executives.*

KNOWING THAT COST accountants are associated with many different companies, I have done some research on the subject of this article, rather than to express my views without this. The result has been to check out my own thinking, and, at the same time, to permit me to accord recognition to the ideas of other production executives in various manufacturing fields. A recent issue of *Fortune Magazine* listed the most prominent corporations in this country. From these, I chose fifty companies I thought representative of American industry, and wrote a personal letter to the vice president of manufacturing of each company. I asked him to list three items supplied by the accountant which were most important to him.

From the response, it appears that production executives are most efficient in answering their mail or else a great percentage of them wanted to express themselves upon this subject. Or perhaps it was not the subject but the accountant they were after. Their response was generous and quite interesting. The whole group expressed thoughts rather similar in nature and corresponding to my own. The comments made fell into three categories and this discussion is confined to these areas. They are:

1. The accountant as an individual as reflected through the eyes of a production man.
2. What the accountants' reports should endeavor to accomplish.
3. The areas in which the production executive feels the accountant can be more resourceful.

If some of the statements, in the paragraphs which follow have a somewhat blunt sound to them, it is because my correspondents quite bluntly confirmed the viewpoints expressed.

## The Accountant as an Individual

It is important that the accountant's attitude be aimed at being of service. It is easy to give a correct answer when all the debits and credits are made

and the books are balanced, but the production executive and his direct line representatives are making decisions every day based upon information available at the time they are made, not ten minutes, two hours, or twenty-four hours later. Service to the production man means being helpful before the fact and not after the fact. The accountant's attitude should be aimed at being of service now. Further, the accountant should have a broad understanding of production problems and willingness to adapt the accounting function to production needs. He should refrain from overwhelming production management with figures having little or no use for constructive action and omit, too, comparisons which are meaningless. Seldom are two periods of time or two different plant operations similar enough to make valid direct comparisons. Rather, the accountant, with an eye to significant trends and with a general understanding of plant operations, should bring out of the accounting system to plant management the information which is current and forewarns of present or impending trouble.

The accountant should be receptive to designing and furnishing reports which are simple and contain information needed by production management. If an accountant were queried as to what absentee costs add to manufacturing costs for the current month you would be hard put to give a direct answer. Likewise, if the average accountant were asked what it cost the company to have an unstable labor load and product variation from month to month, he would be hard put for an answer. Yet these items are expenses of running a factory organization in which the production people and top management are vitally interested. They want to know how these costs affect product costs. They do not appear on the balance sheet, nor on the profit and loss statement as identified items. (They are in both places but hidden.) They need to be developed and brought to light for intelligent understanding and action. Other hidden costs are going on every day in every company and the accountant has responsibility of revealing them, top-side.

Moreover, the accountant should have a knowledge of processes and capabilities of machines used in his business. In other words, it is important to speak some production language. One of the greatest things an accountant can do to gain the respect of the other fellow is to understand some of the other fellow's problems. Wherever I have found respect and admiration for a plant accountant, I have found willingness on his part to be humble and to make a point of learning a bit about the problems which surround fabricating and processing equipment. Of course, this is a two way street. The production executive should realize that the reports he gets are no better than the accuracy of the data which he furnishes the accountant out of his daily operating

and production accomplishments. He must understand that the accountant is merely reflecting what has been put into the record.

Another responsibility of the accountant is to use a system that is consistent. Some production executives have a tendency to attack the system when the system shows unfavorable results. This is not good thinking. However, there is justification of complaint on the part of the production executive if accountants keep changing the rules of the game. Then he is in a quandary. It is important that the accountant be consistent with application of accounting rules. After all, the thing that the production people should be made mindful of is trends. Trends reveal conditions. But when accountants keep changing the card of accounts, they make it difficult to establish trends or keep them clear.

### *What the Accountant's Reports Should Accomplish*

I have always felt that a plant manager, a plant superintendent, a department head, or any production individual, should have the answer to his costs reported to him on one side of an 8½ x 11" sheet of paper. Too often we production people are expected to deal in facts in terms of volume of data, rather than in terms of simplicity of data. Generally speaking, when we have too many facts, we tend toward too much complexity and the chances are the reports will be misunderstood and misinterpreted. The simpler the report, the better for all concerned.

To be of value, all cost reports should measure relationships to an objective. In other words, when you speak in terms of scrap costs, do not speak in terms of $5,000, $10,000, $25,000, or in round figures without reference to an objective figure. Reduce the objective figure to terms of units of production. For instance, scrap costs should be figured as a percentage of material used or per direct labor dollar or per machine hour and in terms of a validated measuring stick. Let us not say we spent too much money on something but that we spend too much money per unit of measurement. When you tell a foreman or supervisor, he "spent" $10,000 in scrap the chances are he cannot visualize in terms of his operations the relationship of the $10,000 to his immediate problem. On the other hand, if you tell him that his scrap cost is running $35 a month, he begins to visualize the problem in terms of figures that he comprehends and understands.

On another point, a lot of work should be done in developing more production "quick costs." As stated earlier, it is important that the production people have current information. Too often, accountants are interested in the debits equalling the credits to the point of shelving reports until the last half of one per cent that affects a report has been boiled out. Try to get quick costs de-

veloped immediately after the accounting period. This will express facts in an atmosphere that is current. Study of a report issued a month to six weeks after the closing is quite unrewarding. If the quick costs are not correct within the one-half of one per cent or within two or three per cent, much is still gained by issuing them because they are current. I am not advocating improper information, but statements should fall hard after yesterday's operations. Let the correction of that percentage of error fall in the following month. Practically all the vice presidents of manufacturing with whom I have been in contact feel this is a most important consideration.

When designing a report, the accountant should keep in mind the background of the people who are to use it. If it is a purchasing report, it should speak the purchasing agent's language; a production report, the production person's language; a report to an engineer, the engineer's language. Most of us do not speak as the accountant. They must learn the other fellow's nomenclature, and then use it in their reports, coaching them in language which the other fellow can better understand.

Then there is the seldom small matter of burden. One tool of the accountant is the technique of allocating overhead. It is sometimes used expediently to spread out costs on a poorly correlated basis. A production superintendent or a plant manager can become difficult when he finds that in the buildup of his costs there are many overhead prorations which the accountant can substantiate only by resorting to considerations outside the immediate operation. Although there certainly are costs which must be allocated by broadly applied techniques in the present stage of accounting art, I seriously caution accountants to reinvestigate whether or not allocation methods are being applied too loosely. If the plant manager or a superintendent is charged with a cost, it is very important that he can go out in the shop and literally see its basis, to the maximum possible degree. If the charge is depreciation on a capital asset, he should be able to see the asset. To go out into the plant and try to "find" costs charged only as an allocation is hard. It is difficult to get production people interested in reducing allocated costs.

The setting of standard is another concern. It is important to show actual costs or stated operating objectives, remaining suspicious of cost objectives or standards based purely on history. Today we are in a most competitive atmosphere. I am afraid historical costs are costs which tell merely what you did, not necessarily what you should have done. Development of an objective "bogie" should be undertaken between the accountant and the production head. If this is ventured jointly, each person gains a feeling of responsibility and pride of accomplishment.

### Areas for Greater Accounting Resourcefulness

The accountant can be very helpful in working with production personnel toward simplifying procedures and reports. Generally, we do over-reporting rather than under-reporting. There is a large area for creative thinking toward eliminating the unnecessary. We have all heard a lot about the tremendous job that mechanization will do in the office of the future. Top management in many corporations overestimates the capabilities of automatic machinery and underestimates the creative ability of the accountant. Management must give the accountant the opportunity to become creative. Management too often is likely to call outside consultants while overlooking the large talents in its employ only desiring an opportunity to be heard. A machine cannot improve on data once placed in it.

The accountant has a tremendous responsibility to play a part in determining the financial impact of management's planning and decisions. Many companies would be amazed if they asked the accountant to furnish a financial playback on decisions based on hunches or a salesman's opinion. The accountant has a responsible role in divulging information on this and should not be afraid to say that the company is about to act on incorrect information.

Somewhat similarily, the accountant has the opportunity of developing new types or reports, some of which cannot be taken out of the "Accountant's Handbook." For instance, serious endeavors to develop a series of ratio reports showing the degree of effectiveness, by plants, of the scrap control program, the turnover and absentee control program, the quality control cost factor of the product buildup, the actual hourly costs which include down time, unproductivity and shop inefficiencies call for creative powers of a high order. We say too easily that our direct labor hourly payroll is so much an hour. There is need to express this in terms of the actual hourly cost. Accountants have a real obligation to point up to the production people fringe benefit costs. The presidents of a lot of companies would be amazed at the fringe benefit costs they are paying if they were expressed in cents per hour.

We are living in an era of automation. Much has been written on it and many millions of dollars are being invested in new processes and equipment. Here again, an opportunity exists for the accountant to team up with the production and engineering people to work toward accomplishing and completing automation projects. The accountant is not fulfilling his obligations if he is playing merely the role of an adverse critic of various projects which come up for evaluation. He has a further responsibility, i.e., to make automation successful in his company. Automation is essential to low cost production. The

accountant must help in the determination of formulas which give guidance to determine whether automation projects are sound financially. It is not sufficient to toss the chart of accounts to the production man and tell him to figure out whether the company should invest in a process. Some companies are developing formulas to test automation projects.

The production manager wants costs set up on cost centers as a means of control. The accountant can be diplomatically aggressive here. Then, too, a more scientific approach to indirect costs must be organized and applied. It is just possible that developing a productivity ratio for the overhead in the company by department would be a step forward. It is rather difficult to conceive, but companies alerted to their responsibilities are making inroads scientifically through proper evaluations and studies of indirect labor. The companies which are aggressively in it are to be numbered on one hand. In the years to come, much more will be done in this direction. Work done so far indicates that indirect labor efficiency in relation to direct labor efficiency, in many cases, starts at 50 per cent to 60 per cent. If we consider that every accountant and top manager is classified as company overhead, and that most of the people reporting to each of them is company overhead we will surely recognize the opportunity that exists in this area for creative thinking.

### *Is Daily Accounting in the Future?*

I would like to sum up with the comments made by one of my correspondents, the vice president of a large, well-known company. He clarifies the future role of the accountant and his relationship to mechanization. I quote him as follows:

**"The payroll, inventory, and cost accounting departments should first of all be responsible for the keeping of accurate records of production and the movement of materials to the extent that figures are available, as needed, for the best possible control.**

**"I have often said that I would like to run the operations of our company with all vital figures available in detail every day, as in the case of running a banking house. Many people laugh at this as being impossible, but I am sure that it is closer to being achieved than many can believe, when we consider all of the electronic and mechanical record-keeping equipment which is becoming available.....Yes, some day I would like to operate my company within an atmosphere of fluid costs just like a bank."**

# Performance Standards for the Plant Accountant

by CURTIS W. SYMONDS

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*What has the plant accountant to do with organization and administration of his function, with budgeting, forecasting, and reports to management, and with company endeavors to control costs and plan profits? A statement of his area and desired level of performance in each of these portions of his work is presented in the accompanying article, as prepared by a group of plant accountants for a division of the company which serves as background.*

IT IS SURPRISING that the valuable operating tool of performance standards has so long been confined to the factory level. The opportunity to extend this type of measurement to the realm of supervisory, administrative, and executive positions represents a challenge which, until quite recently, has gone completely unanswered. However, two major factors have been largely responsible for a small beginning which has now been made and which is rapidly becoming a growing trend towards the development and use of performance standards for members of the top and middle management groups.

The first has been a gradual awareness of the fact that standards for the hourly worker have done more than merely establish a useful base for budgets and cost control. It has also opened up a two-way street of communication between the employee and his immediate supervisor which gives each a common understanding of what is expected and just what constitutes satisfactory performance on the job. The somewhat belated discovery has now been made that managers, engineers, and cost accountants will respond in much the same way and that the introduction of written performance standards for their jobs provides exactly the same type of personal incentive and creates desire to equal or better the established level of performance.

The second consideration, and the one which has probably done the most to accelerate the use of performance standards, has been the rapid post-war expansion and growth which has taken place throughout industry. The unprecedented demand for trained men to be moved up quickly into positions of greater responsibility has placed on management the burden of finding a better means of evaluation and appraisal of the individual. The idea of written per-

formance standards has been borrowed from the factory to form the missing link between the job description and the performance review.

The task of preparing suitable performance standards is not a simple one and, understandably, becomes more difficult for each successive level of responsibility within the organization. It is obviously easier to agree on adequate standards for the employee whose output can be measured in so many units per hour than it is to describe a satisfactory level of performance for the vice president of the company, whose efforts cover a wide field of endeavor and take the form of judgments and directives. There are, however, certain very basic principles to be followed which make it possible to analyze and define the performance desired for any function at any level of responsibility. In approaching the subject of performance standards for the first time, the case history of their development and use for the job of plant accountant at Sylvania Electric Products Inc., provides an example of the techniques employed in a field in which the company's rapid growth had focused attention on the need for qualified personnel.

### *Self-Description; Recognition of Five Job Areas*

The decision was made at the outset to have the standards prepared by the plant accountants themselves. It was felt that group participation in establishing the performance standards would make them much more readily acceptable than if they were drawn up by higher authority and simply handed down for use. This not only proved to be true but it was later found that, in setting their own standards, the accountants voluntarily proposed a much higher level of performance for themselves than an outside committee would have suggested.

The job description, itself, provided the starting point as a means of defining the areas of responsibility and description of specific duties to be performed. This soon proved to be entirely too brief and too general in nature, and was expanded into a lengthy list covering every conceivable function performed on a daily, weekly, monthly, or annual basis. After considerable discussion and review, the preliminary listing was next condensed to a summary of the major important functions and responsibilities common to all plant locations and grouped under the following general headings:

1. Organization.
2. Administration.
3. Budgeting and forecasting.
4. Management statements and reports.
5. Cost control and profit planning.

The stage had now been set to consider the development of individual per-

formance standards which would provide an explicit and measurable yardstick for each facet of these broad areas of job responsibility.

### *The Statement Eventuates*

To accomplish the objective, a working definition of a satisfactory standard was agreed upon as "a statement of conditions existing when a good job results," and a decision was reached to avoid generalities which would not lend themselves to measurement. With these goals in mind, standards covering organizational responsibilities were established. They prescribe that as to organization aspects of the plant accountant's work, performance is up to standard when:

1. The plant accounting department is properly organized and adequately staffed to carry out its functions in an efficient and economical manner.
2. Personnel are properly selected and trained to handle their specific duties and the workload is effectively delegated.
3. Job descriptions and performance standards are established and maintained for each member of the department.
4. A performance review and post-appraisal interview is conducted with each employee at least once a year.
5. An active training program is maintained for the development of subordinates.
6. Departmental salaries are reviewed on a scheduled basis and appropriate action taken.

It is interesting to note here that these six standards which the group set covered duties and responsibilities which were not even mentioned in the company's written job description for the plant accountant. In preparing these particular standards, the accountants had voluntarily assigned to themselves certain definite functions for which they recognized responsibility and, in so doing had established, a high level for satisfactory performance. The same philosophy went into the consideration of their various administrative duties which proved to be the most numerous of the several groups. It was specified that administration of the plant accountant's job is up to standard when:

1. All standard practices and established accounting policies of the company are properly followed.
2. Procedures are established for the adequate protection of petty cash funds, inventories, equipment, and other assets under plant control.
3. Payroll calculations are prepared accurately on a weekly schedule and suitable safeguards are provided for the disbursement of wages to employees.
4. All purchase commitments are made in written form on approved purchase requisitions, in line with established budgets.
5. Vendors' invoices are matched with supporting documents for approval and payment by the due date and all cash discounts are taken.
6. Miscellaneous sales of materials, supplies, and services are supported by shipping papers and invoiced on a current basis.
7. Employee expense accounts conform to established company policies and are submitted for reimbursement within the current month.
8. An approved procedure is followed for the monthly valuation of raw and in-process inventories.
9. An accurate and systematic method is employed for the recording of the pro-

duction of finished goods by code number.

10. Inventories of raw and in-process materials are reviewed for obsolescence at least twice a year.
11. An approved program is followed for the retention and destruction of records.
12. Completed staff work is performed for the plant manager in connection with routine and administrative functions.

This section of the performance standards also went well beyond the rather brief outline to be found in the job description and claimed broad areas of administrative control which more clearly defined the scope of the plant accountant's participation as a member of the management team. At the same time, standards of how these duties should be performed were described in precise and measurable terms. Following on to standards for budgeting and forecasting, it was found that these were somewhat easier to express, since they contained elements of mathematical accuracy, could be related to established time schedules, and dealt in general, with the more readily recognized working tools of factory cost accounting. It was offered that budgeting and forecasting performance is up to standard when:

1. Annual manufacturing budgets and fixed and variable budgets are prepared on a uniform and consistent basis and are issued on schedule.
2. Standard costs reflect the predicted manufacturing costs at predetermined volume levels within an accuracy of at least 5%.
3. Standard allowances for materials, labor, and overhead provide for effective comparison to actual performance at various production levels within the limits of the budget.
4. Manufacturing budgets reflect the gradual attainment of average standard costs and measure the effect of volume variance for each calendar month.
5. Annual permanent property budgets are prepared and issued on schedule, together with supporting detail where necessary.
6. Three-month manufacturing forecasts are prepared monthly which correctly interpret current operating conditions and accurately predict significant variances from standard cost.
7. Standard-type costs are prepared on the basis of engineered labor standards, analysis of specific operating efficiencies, and allocation of overhead expenses by cost center.
8. Cost estimates on new types and new projects are submitted as required, which fairly present the expected cost and operating efficiency.
9. All operating budgets present realistic and attainable objectives based on analysis of past performance and scheduled improvements.

These statements constituted a forthright expression of exactly what the plant accountants felt was expected of them and at what level of performance they should be measured. Going on to the area of management statements and reports, the group placed particular emphasis on the reporting function of the plant accountant, recognizing the value and importance of prompt and effective communication in this critical area of their job responsibility. It was represented that, for management statements and reports, performance is up to standard when:

1. Manufacturing cost reports are prepared for each product or operating location and are issued by the 8th working day of the following month.
2. Cost comments are prepared for management which present a brief and informative analysis of significant trends and current variances from standard.

3. Prompt and effective corrective action is initiated or recommended on costs areas which are off standard.
4. Special reports are instituted as required by operating conditions.
5. Monthly turnover reports are prepared and issued for all raw material inventories.
6. All reports are subject to continuing review to simplify preparation and improve the timeliness and utility of the information.
7. Obsolete reports are discontinued.

Again, the comprehensiveness of the standards may be noted. The group went on to the last section of the performance standards, dealing with cost control and profit planning. This side of the work proved to be the most difficult to define in terms of measurable performance, since it dealt with areas of creativity and job enlargement. The group insisted, however, that the areas of cost control and profit planning be strongly emphasized even though certain generalities were found necessary. The resulting statement was that cost control and profit planning performance is up to standard when:

1. A system of budgetary control of manufacturing expenses is established and followed.
2. Special expense requests are initiated as required and an adequate follow-up is maintained.
3. Active participation is taken in the profit improvement program.
4. Inventories of raw materials and supplies are kept within established "bogies" for turnover.
5. Accounting routines are performed in a manner which will lead to a gradual reduction of auditing costs.
6. Reserve balances are properly established and controlled.
7. Cost consciousness is developed in all departments of the plant through effective cost reporting.
8. Cost reductions are planned which will maximize profits rather than minimize overheads.

### *Two Favorable Results*

Although these performance standards have been drawn up to meet the needs of one particular company, the functions described and the level of performance indicated will be found readily adaptable to the needs of the industrial cost accountant in almost any line of business. The results of this work have been twofold. The preparation and issuance of formal written performance standards has given management a uniform and consistent means of evaluation and appraisal against stated objectives which provides a sound basis for counseling and for promotion. The greatest benefit, however, has probably accrued to the plant accountant, himself, whose efforts in creating acceptable standards of performance have opened up new horizons for him in the field of professional management. In short, the very act of thinking in terms of specific objectives and how to meet them has inevitably led to improvement in work performance.

# Financial Charting for the Board of Directors

by HOWARD D. BOYLAN

*Research Accountant, The Chemstrand Corporation, Decatur, Alabama*

*Some of the physical details of the charts made up to report to the company's board of directors and many of the details of presentation and interpretation are given in this article, illustrated by sample charts. It is indicated that charts "take over" presentations where formal reports and discussions leave off and confirm impressions given or resolve questions raised.*

A SUCCESSFUL CHARTING PROGRAM is much more than a series of multicolored bars marching monotonously up and down the hills and valleys of the financial past and future. Like any other major undertaking, it must be thoroughly planned in detail, in advance of the final product, and be advertised and sold to the "customer." This paper describes the charting program developed in our company. The final product is a result of many months of planning, trial and error, and compromises. Our charts continue in the stage of adjustment and improvement, but the major task of development has been completed. The finished product is a chart which tells a story, an effective story which is dependent upon the content of the chart as well as the artistic manner in which it is presented.

Although data in report form is often best for the financial-minded members of any board, such may not be the case with other members whose daily fare does not call for consumption and interpretation of financial data in large quantities. They need graphic presentation of financial data, which lends itself to a common interpretation of trends and simplifies the presentation of relationships between items. On the other hand, not a few board members have been thoroughly entwined in the confusion of yards of bright colored tapes, checkerboard bars, and a mass of arrows aimed at precarious angles to assumed points of interest. Hence the graphic presentation of financial data to the board of directors is one of the most ambitious and complex jobs an accounting staff can undertake. It requires a lot of imagination, perspective, perseverance, artistry, and mechanical skill to do the job. How can financial information be charted in a clear and concise manner? Moreover, how can this be accomplished without sacrificing detail needed to illustrate a point or stimulate interest?

When asked his opinion on charts, one member of management replied, "There are always two things wrong with charts. First, they are never large

enough. Second, charts are always too complicated." Working from these two assumptions (plus several additional minor limitations) we set out to prepare a set of acceptable financial charts.

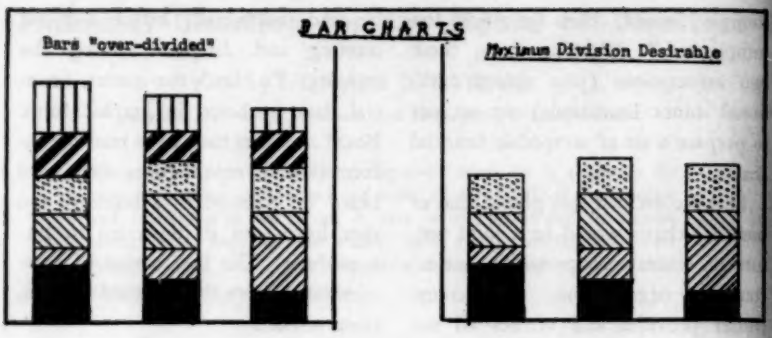
First we decided that preparation of financial charts would be a joint venture of several groups within our accounting organization. The comptroller provides and verifies all statistical data in the final form in which it appears on the chart. The treasurer supplies the financial forecast information. Members of a special study group develop and assemble the data into graphic form. The heads of these three groups comprise the committee responsible for the approval of the finished chart. The charts are then presented to the vice-president of finance who becomes familiar with all the information in preparation for presentation to the board of directors. The following paragraphs reflect what we found out about charting and describe charts used and manner of their use.

#### Charts and Preparation Techniques

Why do we bother to present financial data in graphic form? The answer is that it is one good way which should be used. The presentation of any topic to a group for discussion can best be accomplished when all possible media of communication are tapped. Financial data are normally presented in columnar report form to be read individually before a board meeting and discussed during the meeting. To clinch the matter, financial data is shown in graphic form. Board members then have read the information in report form, they have heard it presented in a briefing, and they have seen it illustrated in pictoral form. The best means of communication have all been used to maximum advantage.

A period of four years appears to be the best span of time for which to offer information in charts, two years in the past and two in the future. Any further expansion of the time frame seems to include information which is too far in the past to be of any real comparative value or too far in the future to be of any degree of certainty. The current year and the preceding year are shown by months for comparison purposes. The other years included are shown by quarters, since the data are either not significant by months (two years prior) or the data shown in the future year are of limited use (and reliability) in any great detail. At times, it may be necessary to take a long range view of operations. When this is done, a special chart with a five or seven year timeframe is prepared.

Considerable latitude is possible in determining chart scales. Each chart, is scaled to its own needs. The accounting periods in our company are quarters, each consisting of two 4-week and one 5-week accounting period.




The above-plotted data has no relation to Company activity

**EXHIBIT 1**

Quantity information is distorted by the unequal periods, so the information is plotted in weekly averages with this scale at the left of the chart and with a scale in terms of annual rates supplied at the right. Annual rates are a convenient term to express a month's operation, since plant capacities, production rates, and sales rates are normally thought of in terms of annual totals. A point or bar, then, can be read in either weekly averages or annual rates from the same chart.

Scale can also be a tool used to emphasize or de-emphasize the importance of a figure and the relationship of that figure to another chart with a similar or dis-similar scale. If slight movements of a figure are of major importance (such as selling price per unit), the vertical axis of the scale is shortened in relation to the horizontal time-frame, thus giving emphasis to a small change in monthly figures. The opposite can be accomplished by lengthening the horizontal axis in relation to the vertical axis. Emphasis or de-emphasis can also be obtained by determining the scale range of the chart. A chart with a broad range for which most of the plotted data fall in the lower quarter of the chart gives emphasis (by means of the unused white area in the upper three-fourths of the chart) to the fact that, for example, operations are at a very low rate in relation to the available plant capacity. The opposite emphasis can be given by developing a scale range for which most of the chart is covered with plotted data. In most cases, however, the scale of the vertical axis is determined in the same ratio as the horizontal axis to give a representative picture of time and value.

As a general rule, we use a bar to denote quantitative data and a line to indicate ratios. In that way, lines and bars can be used in combination with each other on the same chart without

The above-plotted data has no relation to Company activity

**EXHIBIT 2**

confusion as to the meaning. The bar then can be broken down into several segments to indicate the quantitative information making up the total figure, thus providing access to elaboration in detail without minimizing the importance of overall totals. There is a limit, however, to the degree in which quantity information can be sub-divided and still indicate the composition of the bar. We decided that a bar should not be sub-divided into more than four pieces and that three are preferable. Exhibit 1 is illustrative. In instances in which quantitative data are composed of more than four major groups, the data are regrouped into some logical form. The upper frame of the chart is usually reserved for lines (ratios). The lower frame can be used with a variety of combinations, such as bars below and lines above, bars only, lines superimposed on bars, etc.

We found color added something not present when pattern areas (stripes, dotted tapes, etc.) were used. Color and combinations of colors are attractive to the eye and can be easily associated with other concepts, i.e., red for net loss and black for net profit. The selection and combinations of colors is quite important. In order to improve the general appearance and to reduce the possibility of confusion, we selected six basic colors. These six are used in bars and lines to represent actual fact or performance. Pastel shades of these colors are then selected to indicate budget or forecast information. In this way, it is quite easy for the eye to differentiate projected figures from actual data without confusion. The difference in shade also serves to pinpoint the attention of the viewer on the current month's operation. When a bar is sub-divided into its components by means of different colors, the colors are carefully selected to provide sufficient contrast. A dark color is selected to "top" the bar in order to provide an adequate background for comparing the total bar height with other bars in sequence.

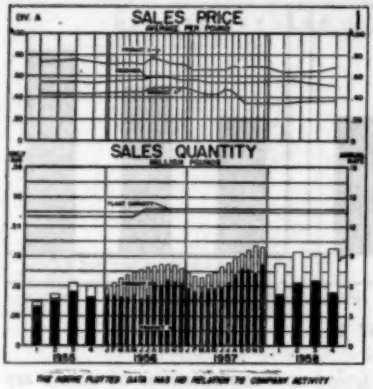



EXHIBIT 3

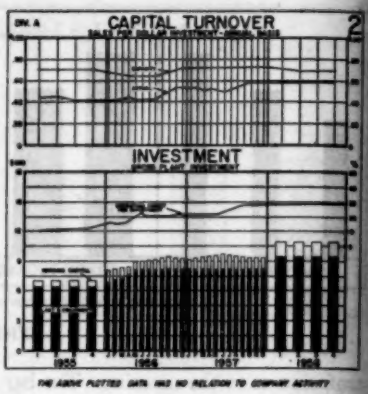



EXHIBIT 4

Colors are keyed to represent the same figure on each related chart, i.e., dark blue—investment, black—income, etc.

On a bar chart, spacing can determine the success or failure of the chart. Exhibit 2 concerns this consideration. We have found that the white space between the bar should be as wide as the bar itself. If the bars are placed too close together, the viewer may lose sight of the contour of the bar entirely. On the other hand, if the bar is narrower than the white area separating the bars, the viewer may not be able to discern the bar or its contents. The width of the bar (and spacing) depends, of course, on chart size and the time frame selected.

As information was being developed, we learned that graphic presentation tends to emphasize the interrelationship of financial data. An increase in the average price line, for example, is reflected throughout the chart series in terms of capital turnover, earnings per cent of sales, operating profit per dollar of investment, etc. An increase in the capital investment incurred in the same month would tend to have a decreasing effect on the same measurements of operation. The information, therefore, is grouped and presented in such a

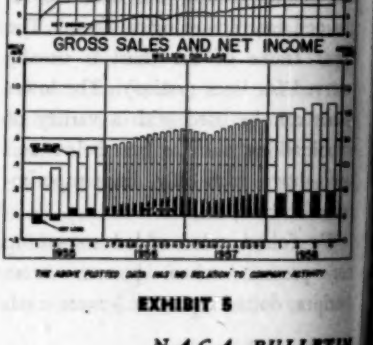



EXHIBIT 5

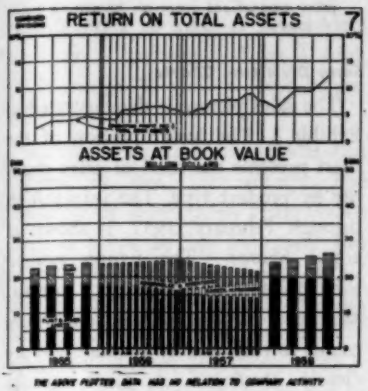



EXHIBIT 6

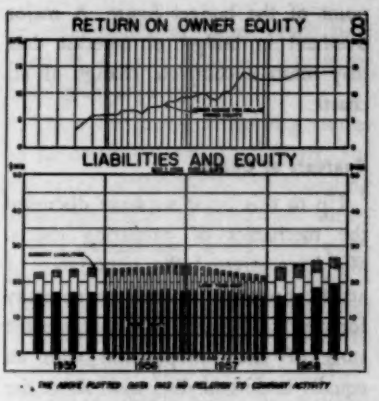



EXHIBIT 7

way that these inter-relationships can be easily demonstrated. In the presentation to either management or the board, the three charts relating to one product are displayed separately and then all three simultaneously, to illustrate the effect of one figure or trend upon the trends of other charts.

***Material for and Maintenance of Charts***

We experimented with a variety of chart boards, tapes, inks, etc., and decided that the materials finally selected must have complete flexibility so that last-minute changes or minor overhauls can be done without sacrificing appearance. This can be accomplished in two ways:

1. The frame or skeleton of the chart is inked onto a white plastic sheet (Styrene or some similar material) and allowed to dry. Guide lines for bars and lines are then penciled in lightly and the entire sheet (36" x 40") sprayed with a clear acrylic plasticizer to "fix" the inked frame. The acrylic spray prevents any damage or smearing to the inked frame and provides an excellent surface for applying colored pressure-sensitive tapes. The tapes can be removed and replaced any number of times without damage to the surface.
2. A second and slightly less satisfactory approach is to use 1/8 inch white chart board and apply the ink for frames. The surface is sprayed with acrylic spray, similar to the plastic material, and allowed to dry. This provides a surface which is not quite equal to plastic board. The tapes may be replaced a limited number of times.

In any event, either surface is superior to the paper surface on chart board which is limited to one or two applications of tape. The tape, itself, is obtained from one of several suppliers of such materials.

Keeping the charts up to date is normally a rather simple chore. As figures are available after closing, the pastel shades of tape are removed and replaced with darker colors representing actual data. A comparison of actual to budget may be desired. If so, a small arrow can be placed at the

point of the budget figure. A major overhaul in budget or forecast data may mean a complete change of all charts.

### Contents of Charts

Up to this point we have discussed the mechanics of preparing charts. We have stressed the importance of artistic presentation and the necessity for clarity in charts. We continue the story of chart preparation with an equally important discussion about the contents of the charts. One of the major considerations for presentation to the directors is operational and management performance. What is the return on investment? How rapidly is capital being turned over? What is the earnings per cent of sales? What are the production and sales levels? There are a number of such ratios and indices which have been developed and are in common use by many corporations. Our company is particularly interested in the managerial tools of operation as shown in the sample charts illustrating this article. (These charts are included for illustrative purposes only and the data presented do not represent actual activities.) Our financial charts are organized along the following lines:

1. Divisional Charts—Exhibits 3, 4 and 5 illustrate sales, capital turnover, and profitability, all on a divisional basis.
2. Corporation Chart—Exhibit 6 presents profitability on a company-wide basis.
3. Investors Chart—Exhibit 7 illustrates company operations from an investor's point of view.

### Some Divisional Charts

The sales picture is demonstrated in Exhibit 3. The lower portion of the chart presents the level of sales quantity by product type. The information through February, 1957, is shown as actual figures. The figures beyond this point are budget or forecast, whichever is desired. Seasonal sales trends in total and by product type are clearly illustrated. A plant capacity line is added to emphasize the degree of plant capacity utilization in relation to sales level. The upper portion of the chart shows the sales price by product type and the combined average price for all products of this division. The combined price line is a function of the price of Products A and B and the weighting of the product mix sold. A decrease in the combined sales price, then, is the net result of price fluctuation or an increase in sales quantity of lower priced Product A, or both. The combined sales line is of particular interest, because it is an indication of cash generation per pound of product sold.

One generally accepted measure of effective use of capital is return on investment. This ratio is derived from two other important measures of business operations: capital turnover and profit margin on sales. Capital turnover is defined as the ratio of sales volume to total investment. Profit margin on sales is the ratio of earn-

ings to sales revenue. A low capital turnover is compensated by a high profit margin to yield a given return on investment.

Exhibit 4 clearly demonstrates this concept by two chart frames. The lower frame shows gross plant investment as a bar divided into plant and equipment and working capital, measured by the scale to the left. We define plant and equipment as manufacturing facilities in operation, at original cost. A line titled "operating profit per dollar investment" measured by the right scale, is drawn above the bar to represent the effectiveness of divisional management's use of capital employed. We have found the most convenient measure of return on investment is to relate operating profit before financing expense and income taxes to the operating investment. Although the ratio yields a higher figure than would be realized by taking the ratio of net profit to operating investment, the measure of operating results is not influenced by timing and changes of financing or tax considerations. The upper frame of the chart shows the sales per dollar of investment (capital turnover) ratio at actual compared with capacity. The capacity line is determined by dividing the sales of rated plant capacity by the total investment. As the actual line approaches the capacity line, the capital is being turned a greater number of times and the return on investment is improved. The capacity line must be recalculated, of course, each time there is a major change in price or rated plant capacity.

There are many interesting stories to be detected from these charts. For example, on Exhibit 4, the operating profit per dollar of investment shows a gradual increase in the third quarter of 1956. A check with Exhibit 3 shows an increase in sales quantities of both Product A and Product B. The combined price line on the upper portion of Exhibit 3 indicates a steady price level despite the sharply lower sales price of Product B and a slight increase in price of Product A. The investment on Exhibit 4 is constant, but the actual line representing sales per dollar of investment increases gradually. The margins and net income on Exhibit 5 indicate a general improvement. The real story develops, of course, when a detailed study is made of the movements of the lines to determine why one line did not increase in the same ratio as another line, i.e., sales quantity increases sharply but gross margin shows only a gradual improvement. Obviously the interrelationship of the chart calls for a complete analysis of a month's operation before presentation.

Exhibit 5 demonstrates the profitability of Division A. In our company, gross margin can be defined as net sales less manufacturing cost. Operating profit can be defined as gross margin less research, administration and marketing expense. Net income can

be defined as operating profit less income taxes and financing expense. The lower portion of the chart is merely a bar sub-dividing net income from the net sales revenue. It is interesting to note that, in the first quarter of 1955, the total height of the bar (including the net loss) represents the level of sales necessary to break even in that quarter. The upper frame in the chart is composed of three lines showing gross margin, operating profit, and net income as a percentage of sales. The divisional manager can be held responsible for the gross margin level. From that point on, corporate officials determine policies affecting the operating profit and net revenue lines and these officials, accordingly, assume responsibility. A sharp increase or decrease in the operating profit line, without a corresponding shift in the gross margin line, usually calls for an explanation in a revised allowance of the research, administration, or marketing functions. The net income line normally follows the contour of the operating profit line unless there is a major change in financing policy.

***Relationship Among Charts; Company-Wide Charts***

The chart in Exhibit 5 can be used in conjunction with those in Exhibits 3 and 4 very nicely. For example, an increase in sales quantity on Exhibit 3 is reflected in improved net sales revenue on Exhibit 5, and the sales per dollar of investment edges closer to the capacity line on Exhibit 4. At the same time, a check of the "combined price" line on Exhibit 3 tells whether the increased sales quantity has generated a greater or lesser revenue per pound of product sold. A further analysis of the upper portion of Exhibit 5 indicates whether the increase in sales has filtered down to a corresponding percentage increase in gross margin, operating profit per dollar of investment as shown on the lower portion of Exhibit 4, and ultimately an improvement in net income. An expansion of plant facilities affects all three charts. On Exhibit 5 the plant and equipment bar is lengthened and the sales per dollar of investment is probably improved. The plant capacity line on Exhibit 3 is raised accordingly. Eventually, Exhibit 5 reflects the increase in plant capacity in improved margins and profits.

After a review of each division's activities, the next step is to present the financial results of the corporation as a whole. The charts in Exhibit 6 and 7 are prepared to illustrate the balance sheet and its major components. The lower portion of Exhibit 6 is merely a bar chart showing the major elements of the assets at book value. The sample chart shows clearly the effect of plant expansion on the asset accounts. Plant and equipment declines (as plant is depreciated) and construction - in - progress becomes a larger portion of total assets. At the

same time, the cash account decreases as construction bills are paid off. When the construction in progress is closed out to the plant and equipment account, the latter becomes a greater percentage of the total asset bar. Inventories and receivables are increased, reflecting a larger goods in process and finished goods inventory, as well as larger volume of business in the receivables account.

The chart in Exhibit 7 is a simple graphic portrayal of the liabilities and equities side of the balance sheet. In the sample chart, owner equity is represented as the lower portion of the bar, with fixed indebtedness and current liabilities making up the remainder of the bar. The composition of the bar would vary as financial policy called for a redemption of fixed indebtedness or an increase in long-term debt. The upper portion of the chart shows the return on the owner's equity in the business. We use the concept of "owner income per dollar of owner equity" to indicate to the investor his security in the business. Short and long-term debt claim a portion of income but, as a business grows and owner equity increases, a greater percentage of income is ear-marked for the investor.

### An Effective Program

All the charts we have discussed are presented to the board of directors. In actual fact, these charts display in some detail all the financial activities of the company. The board charts are supplemented by other charts presented to divisional management. This program is designed to show plant management the same picture as shown to the board but limited to the activities of particular interest to plant level management. Plant management has the opportunity to review its portion of the chart program before presentation to corporate management and, ultimately, the board.

Charting financial data has two outstanding advantages over other techniques of financial report presentation. It emphasizes the establishment of trends and it provides a means of demonstrating the inter-relationships of financial results and prospects. Charting is another means of communication—a very effective one, we believe, if properly planned and executed. Preparation of good charts is indeed a very ambitious undertaking for an accounting staff but our experience has indicated that it can be done successfully through careful study and planning.

# Ways of Getting Your Report Through

by L. W. BRUMMER

*Plant Accountant, The Chemstrand Corporation, Pensacola, Florida*

*Unless the meaning of parts of a report, whether tables or comments—or possibly spoken words—enters the mind of the reader, nothing is accomplished. Ways of removing barriers to such reading—or listening, and making it attractive and profitable are described in this article. Typographical arrangement of tables and use of effective wording are among the topics treated and illustrated.*

LET US SUPPOSE that your accounting reports are efficient and modern in every respect. You have followed the best current practice. You have spent a great deal of time and effort designing your system of accounts and the flow of source documents. Your information is accurate, precise, and quickly gathered at the end of the period. Your standard cost system is well constructed; it gives good results for area control and for product costs. The information is all there—it is available quickly—it is concise, thorough, complete, and in balance. You have provided an abundance of information which, when assimilated, will be of great benefit in directing the management of your enterprise toward a more profitable future.

But now that your figuring is complete, how are you going to transfer this information to those who should have it? How are you going to "get the message through" to your executives? Unfortunately, this question never occurs to many accountants. We simply cause some forms to be filled out and placed in the plant mail. This automatically discharges our duty. A job done? No—a job only begun. For our job requires that the final result of our computations be not in the plant mail but in the manager's mind. Just suppose you were on the receiving end of those mailed reports. What would happen? First, they would await your habit or pleasure in opening and sorting your mail. Then they would be subject to all the hazards of competition with the plant news sheet, the safety summary, and the request for double time on Sundays. When you finally read them, you might assimilate only parts—probably the parts already familiar because of opinions you had already formed.

In brief, the executive is busy—and wants to be. The things which command his attention, the things he talks about right now are the things which are simplest to comprehend and which call for immediate action. Your

executive wants to act. He likes to feel accomplishment as the result of his busy day. He wants facts which he can fit into his mental picture of the present and future status of the enterprise. He wants to act, either now or at a future appropriate time, upon the facts presented to him today. He wants information which will impress him as actionable. My purpose in this paper is to consider several means of successfully transferring information so that it will be of this character. The means are familiar but the best ways in which to use them may not be. Schedules need clear design and typography. Reports and letters need the careful use of clear, concise, simple language. Charts need effective planning. Oral presentations need visual aids. All of these are tools designed to "get that message through" and we must become skilled craftsmen in using them.

### Schedule Composition and Typography —Three Illustrations

All of us use forms, tables, and schedules every day. We compose reports regularly. We type, print, or hand-write columns of figures with abandon. Most of us soon adopt routine forms for regular reports and rarely change them. Most of us understand our reports through long familiarity. How many have ever tried to take a detached point of view and consider the ease of readability and comprehension involved? A good test is to read reports devised by others and see if they will keep you awake. The report should be clear as a window, so that it would be an effort *not* to see what it discloses. In the first place, because comprehension improves with familiarity, uniformity in report form is a virtue. Once a good design is achieved, it should be adhered to until a decision is reached to change it. If you prepare one hundred cost reports and use them in ten different sections of the business, all should follow the form adopted. Improvements should be applied throughout. In a decentralized organization, each section may insist it has special needs. Often these do not relate to essentials and do not require change if the mission of the report is adequately covered by the company-wide form. Secondly, get each of your reports on an 8½x11 page. Nothing is more annoying than one out-size sheet or book obstructing your boss's file. It's amazing how you can squeeze and cut to get a lot on a sheet—usually making it more readable, too. Eliminate that second page whenever possible. Any report is easier to read on one sheet than on two.

Then there is the matter of typography. Because many statistical reports are regularly typed and many forms are first designed on a typewriter, the necessary details of good typography should receive attention. A poor job this month will be copied next month.

A thorough study of the proper length of one underscoring, even if it uses a full hour of the chief accountant's time, will provide the proper example to be copied in future periods. Each monthly report thereafter will be more readable. When you open your reference file, no apologies for report appearance will be necessary. In this connection each company should adopt its own conventions for typewriter composition. The following report in its original form shows how poor a piece of composition can be when it is not studied and its revision shows the effect of studied arrangement:

(Original form of report)

EMPLOYMENT REPORT

| | MALE | | | FEMALE | |
|---|---|---|---|---|---|
| | SKILLED | SEMI-SKILLED | LABOR | SKILLED | SEMI-SKILLED |
| | 1418 | 1632 | 95 | 1823 | 2128 |
| Total | | 3145 | | 3951 | |
| Total | | | 2096 | | |

(Revised form of report)

PLANT PERSONNEL SUMMARY

September 30, 1956

| | Number of Employees | | |
|---|---|---|---|
| Class | Male | Female | Total |
| Skilled | 1,418 | 1,823 | 3,241 |
| Semi-Skilled | 1,632 | 2,128 | 3,760 |
| Laborers | 95 | — | 95 |
| Total | 3,145 | 3,951 | 7,096 |

Here are the points illustrated:

1. Title and Date: The title should describe the contents of the table completely. If this can be done concisely, fine. But smooth phrases should be abandoned if they do not describe the presentation correctly. Every report must be dated.

2. Headings: In the original, note that the use of upper case with a group of other upper case headings destroys the effectiveness of the larger type and makes the numerals look lonesome.

The heading, "number of employees," in the revision describes all the figures under it. It is equivalent in stature to "Class." However, "Class" is shown on the next lower line because there is no equivalent in that column to "Male," "Female," and "Total." The point here is never to leave a blank space below a heading word. Drop it down instead. A lower case heading with an underline is often most effective.

3. Composition: The author of the

first schedule appears to have set the figures down in the order they occurred to him. The second schedule shows the results of training in order and readability.

4. Totals: The first schedule does not allow totals to be listed for the classes of workers. The second schedule provides totals both by sex and by class.

The words, "Total," in the first schedule are completely out of balance and out of place. Note that, in the second schedule, the word is placed in line with the items above it, with no indentation or underscore. This is a convenient practice, particularly helpful in longer and more complicated schedules.

5. Underscores: The line under "Number of Employees" covers the three columns it heads, and ties them together. The lines under "Male," "Female," and "Total" do not exceed the length of the headings, which, in turn, are generally not longer than the longest figure in the column. A single line is used under the last figure to be added and a double score indicates the end of the calculation. Each underscore is exactly as long as the longest figure in the column. Note that individual lines are used for each column. The common device of running a single long line under all the columns destroys ease of reading.

7. Commas: The use of commas to set off thousands depends on the length and complexity of the report and the extent to which they aid clarity. A company's typography conventions should either endorse or forbid the use of these commas, since uniformity is an important aid to readability.

8. Blank spaces: Note that a hyphen is used in the space allowed for female laborers. This is a positive indication of "none" and its consistent use is desirable to differentiate it from omission by error or non-applicable data.

Another set of examples, this time with dollar amounts, follows:

(Original form of report)

SUMMARY OF PRODUCT COSTS

September, 1956

| | Quantity | | | Amount | | |
|---|---|---|---|---|---|---|
| | Standard | Actual | Percent | Standard | Actual | Percent |
| Product A | 11956½ | 20247¾ | 170 | 5789.56 | 11382.29 | 197 |
| Product B | 571932¾ | 562975¼ | 98 | 262591.22 | 259687.34 | 99 |
| Product C | 792423½ | 864976½ | 108 | 79242.30 | 86497.60 | 109 |
| Product D | 29420 | 25630 | 87 | 50864.71 | 45932.22 | 91 |
| Product E | 1123946 | 1296832 | 115 | 23976.22 | 25497.33 | 106 |
| Grand Total | 2529678¾ | 2770661½ | 110 | 422464.01 | 428996.78 | 102 |

(Revised form of report)

SUMMARY OF PRODUCTION AND COSTS

September, 1956

(data in Ms)

| | Quantities | | | Amounts | | |
|---|---|---|---|---|---|---|
| | Std. | Act. | Pct. | Std. | Act. | Pct. |
| Product A | 12# | 20# | 170% | $ 6 | $ 11 | 197% |
| Product B | 572 | 563 | 98 | 262 | 260 | 99 |
| Product C | 793 | 865 | 108 | 79 | 87 | 109 |
| Product D | 29 | 26 | 87 | 51 | 46 | 91 |
| Product E | 1,124 | 1,297 | 115 | 24 | 25 | 106 |
| Total | 2,530# | 2,771# | 110% | $422 | $429 | 102% |

Note the following points in this illustration:

1. Use of thousands: The improved schedule is more readable than the original because the figures are shorter, due to omission of fractions and rounding to the nearest thousand. Note that the indication of thousands is included in the heading (data in Ms).

Many accountants will find that the use of complete figures adds nothing to the result required, i.e., transferring the information into the executive's mind. For most purposes, it is true that the executive needs to think in round figures only and needs only these for reference purposes. As a result, complete figures are best relegated to the accountant's working papers.

Often the comment is made that it is more work to round figures than to leave them complete. This stems from the admitted nuisance of going back over a column of figures to juggle the last digits so that they will add. However, the extra readability is worth the effort and, when the philosophy of rounding has permeated your system, you will find that the eliminated writing and adding of many figures has offset the time spent in rounding. In cases in which it is undesirable to force the last digit in order to make the column add, the convention may be used of a symbol beside the total (such as *) which will indicate that the column does not add because of rounding. Another convenient device is the use of a symbol (such as @) in place of a figure which is less than one thousand. This is useful when it is desired to indicate the difference between a minor amount and nothing. Still another arrangement which has been used successfully is a line called "round-off" as the last item in the column, containing the odd digit or two.

2. Column headings: Note that "standard," "actual," and 'percent' have all been abbreviated to make

them not longer than the figures underneath. Note that they lose nothing by this abbreviation but that the schedule gains in readability. Note that the major headings, "quantities" and "amounts," are underscored with a line that extends the full width of all columns which are to be read together.

3. Column spacing: The first schedule shows the quantity percent column so close to the standard amount column that the natural assumption is that they go together. The improved schedule leaves exactly the same space between "std." and "act.," and between "act." and "pct." but more space between the "quantities" section and the "amounts" section. Thus our eye easily picks out the difference which the author intended to present.

4. Use of symbols: The # sign, $ sign, and % sign are each used beside the first number in the column and for each total and sub-total. If all figures were in pounds, we might omit the # sign and include in our heading "data in M pounds."

A third illustration concerns uses of underlines and $ signs:

**PROFITS & LOSS SUMMARY**

**September, 1956**

**(data in Ms)**

| | | | |
|---|---|---|---|
| Sales: (quantities) | | Sales Deductions | |
| Product A | 15# | Freight | $ 2 |
| Product B | 564 | Discounts | 3 |
| Product C | 802 | Commissions | 4 |
| Product D | 35 | Total | $ 9 |
| Product E | 1,090 | Net Sales | $ 660 |
| Total | 2,506# | | |
| | | Cost of Sales | |
| Sales: (values) | | Product A | $ 7 |
| Product A | $ 12 | Product B | 260 |
| Product B | 390 | Product C | 80 |
| Product C | 160 | Product D | 65 |
| Product D | 75 | Product E | 22 |
| Product E | 32 | Total | $ 434 |
| Total | $ 669 | Gross Margin | $ 226 |
| | | Budget | $ 233 |

Note that a double underscore is used under the total sales quantities to indicate the end of that calculation. However, under the total sales values a single underscore is used, so that a later subtraction can be made. The sales deduction block is set off by single underscores and the net sales amount is the result of subtracting two numbers, each of which is isolated between single lines. The cost of sales is also separated and the total ob-

tained. This is subtracted from the enclosed net sales figure to obtain the gross margin. Now we use a double underscore because the end of the calculation has been reached. When we want to compare this with the budgeted figure, we use a double underscore to show the equivalent status of the final figure.

#### The Report Comments

Now that we have prepared our statistical schedules and financial statements, we feel a desire to accompany these bare figures with some sort of prose commentary, be it a letter or report. Undoubtedly such a composition can do much to accomplish our object of transferring the information to the executive's mind—*if he reads it.* Whether or not he reads it depends very largely upon the style in which it is written.

How do you get your ideas across in personal conversation? Some of us are good salesmen. Given an opportunity to talk to our executives, some of us can get them to understand what we are saying. But if we were to make a tape recording of that monologue, it would never be published. It would be full of short words, incomplete phrases, repetitions, hesitations, illustrations, and changes in tone of voice. Present, but inaudible, would be the gestures, facial expressions, and subconscious physical inflections which do much to transfer meaning.

When we write, we become self-conscious, stilted, and sensitive to the rigid rules of grammar we learned long ago. How can we capture on paper some of that personal spontaneity of informal conversation? First, let's consider the use of "thought-catchers." Titles or opening sentences should be interesting to the intended reader. Here is an example of the opening from a letter accompanying a plant income statement:

"Sales this month were 2,023,97[illegible] pounds as compared to 1,972,394 last month."

Suppose instead we write:

"Our sales this month were the highest in two years. 2,024M pounds were sold, an increase of 52M pounds over last month."

Which opening catches your attention and urges you to read on? Which gives the executive something to talk about?

The letter we write to our executive may be on some subject less cut and dried than a financial statement. Suppose, as controller, it is your duty to write a letter on difficulties in store room records and practices. You might indicate as the subject of your letter as "Report of detailed study undertaken as a result of unfavorable turnover of stores inventory." However, suppose you titled your report "More Return on Stores Investment." Which report would have a better chance of being read?

Secondly, let us personalize, illustrate, and simplify the language of our

reports. What is wrong with using the first person? Is there anything so sacred about our financial reports that they must be couched in vague, hands-off language? Here is a hypothetical example of such wording:

"It should be understood that amortization under the authority of the certificate of necessity has been eliminated from consideration prior to computation of the return on investment percentages shown on Table 1 of subject report."

This does not get our message through. We have wasted our executive's time if we ask him to read such verbal hash; most likely he just will not read it. Why not something like this: "We took amortization as allowed by our C. O. N. but figured the return on investment per cents first." Or, better yet, how about an asterisk beside the per cent figures and a footnote reading "before amortization"?

In the stores inventory example suggested above, suppose our fictional report carried this sentence:

"Excessive variances have been noted in many different classes of items between ledger quantities and quantities determined to be present by means of physical inventory."

Translated, this becomes "Physical inventory disclosed many variations from book records." Personalized and illustrated, it becomes: "We took an exact count of items on hand. The records showed 48 pairs of men's work pants, size 36, but we found only 15 pairs. Two hundred other items were short and three hundred were over." The use of the personal pronouns and the specific illustration let these sentences "carry the message." Perhaps the shorter "translation" is better for some purposes, but there is no excuse for the original sentence with its heavy verbiage.

Accountants tend to overwork words and phrases. Let us put some out to permanent pasture. Here are examples:

| Bad | Better |
|---|---|
| It may be assumed | I expect |
| It has been determined | We find |
| Reflects | Shows |
| Is found | Appears |
| Inasmuch as | Since |
| Firmed-up | Settled |
| Ensuing | Following |

Imaginative use of punctuation often adds to clarity. The colon, semicolon, parenthesis, hyphen, dash, and underline all are valuable tools. Use them a bit rashly if they add to clarity. Here are some examples:

"Production in August rose to 8,132M pounds (July 7,932M); sales dropped to 7,865M pounds (July 8,023M); the resulting inventory increase was 267M pounds (July decrease 91M)."

"If we are concerned with future sales of Widgets, we must re-consider the decision to drop Miflins; that is, the decision to change from aluminum to glass which would eliminate the by-product used in Miflins."

"The forecast for December is 2,230M pounds—as compared to the budget of 1,870M pounds—and as

contrasted with last year's actual of 1,265M pounds."

#### Oral and Visual Presentations

We have dealt so far with written presentation. Perhaps the best way to "get your message through" is person-to-person. If you can get an audience with your executive, you have the best chance of transferring information. But if you want a second audience, you had better make the first one worthwhile! You may wish to combine appeal to the eye and to the ear. It has proven successful for many accountants. Give your executive something to look at and then tell him what you know about it. The common use of this technique is called "going over the reports," in which each person in the conference is equipped with his own set of reports and each makes his own comments.

Examination of the reports in conference is particularly valuable for the several echelons of supervisors under the top executive. These supervisors want to be ready for any question the "boss" may ask as a result of reading his copy of the reports. They are interested in the details appearing on the report and the relationship of the figures shown to occurrences in the factory. The accountant and the supervisor can both gain a great deal by going over the reports as they are finished — preferably in their semi-final stages so that detected errors may be corrected. This arrangement will give the supervisor the advance notice he should have of the report results and will allow the accountant an opportunity to evaluate his figures from an operating viewpoint. It will promote the sense of teamwork which is essential to good results from reports.

For a top management group and for groups of supervisors who are concerned with discussing results, better concentration comes from a single display which all can read together. This may be in chart form, using a set of large charts displayed one at a time, with one person explaining changes in classroom style with the help of a pointer. Charts must be clear. Size of letters and figures is most important, as well as use of colors and line contrasts. Sometimes good results are achieved with colored slides, which have the advantage of being small enough to transport easily and are capable of being enlarged to any size desired. Another method is the use of large-size financial data reports which can be displayed in front of a group and discussed point-by-point in logical order. A large tablet on an easel is an excellent devise for this, inasmuch as the tablet sheets can be prepared in advance, saving writing time, and can be marked and corrected as the discussion progresses. For a limited amount of material, an ordinary blackboard is very good.

Whatever conference method is used, the conference, itself, must be a

regular event conducted as scheduled. We are all creatures of habit. We will attend a conference regularly if it is held regularly. A presentation of cost results held on the second Monday of each month at 8:30 a. m. in the boss's office will have the advantages of continuity, expectation, and preparation.

#### *The Goal: Transferred Meanings*

Our objective as accountants is more than the compiling of data. Our value is measured in terms of the results achieved through management's use of the figures we compile. Once our figures are ready, we must present them in such a way that meaning is transferred. Once an executive has absorbed the results and has determined their significance, he can go ahead with plans and actions designed to improve the profit margin. He can "execute"; he can act. In our organization, we attempt to follow typographical conventions and write in a readable manner. We make use of illustrated oral presentations — charts for executive management and the board of directors and display-type statements for the plant management. These fill a need, as we know by our continued invitations to come back again next month.

# Letters to the Editor

## ACCOUNTING AND LOGIC

*Editor, N.A.C.A. Bulletin:*

Just as problems are common to all worthwhile fields of endeavor, so is the general plan of solution of problems. This general plan is the logical process of inductive reasoning. It is generally described as consisting of four steps:

1. State the problem clearly.
2. Collect, classify, and sort the facts.
3. Draw conclusions.
4. Test or prove the conclusions drawn.

Books are written in almost every field which, when analyzed, are found to be based wholly on this one process, whether they are on salesmanship, management, profit planning, or personality. They state the problems, discuss it, anlayze it, make certain that it is the real problem involved, set it up in its simplest and clearest terms, and proceed, in the main part of the book, to bring out the facts, gradually classifying and sorting them out until a logical conclusion is indicated. The conclusion is then stated, discussed, analyzed and subjected to sufficient testing so that it appears reasonable beyond doubt and areas which cannot be cleared up, for lack of facts, are noted. What else is back of "brain-storming", "operations research", and "integrated data processing"?

Accounting itself is a process of inductive reasoning. Let us take a look at it as it follows the steps outlined above:

1. Stating the problem — What is the financial condition of the company and what are the results of operations for the period?
2. Getting the facts — The facts or data are collected and classified in the books of original entry. In the simplest case this is the general journal. Here transactions are classified in the manner they are to be sorted out in the ledger, account by account, debit and credit, and transcribed to work sheets, if necessary. Here they are further sorted into financial condition data or operations data. These groups are then gathered into the balance sheet and the income and expense statement.
3. Drawing the conclusions — The statements represent the solution to the problem. Definite conclusions as to the financial condition of the company and the results of operations for the period are indicated.
4. Testing the conclusions — The results shown on the statements are compared with previously determined standards, analyzed and interpreted for management, and tested in their application to operations.

Of course there are pitfalls at every step. Stating the problem offers an example of this. A little study of a situation may show that what appears to be the problem at hand may be but the result of a broader, underlying condition.

Regardless of developments in arts and science, accounting or engineering, mechanics, electronics, or combinations such as automation, there is still the need for good, clear thinking, with first things first. This seems to be one of the best arguments for a good foundation in liberal arts before specialization in any field. Although logic will not, by itself, solve any problems of accounting (or of any other field) it offers the best and only satisfactory means of reaching conclusions quickly, efficiently, and correctly.

FRANK G. WHITE

## THREE LITTLE QUESTIONS

Editor, *N.A.C.A. Bulletin:*

"How old are you?" "What did you major in?" "What are you worth?" These inquiries sound pretty personal but, then, we are asked such things when we apply for jobs. They must be important.

How old are you? It seems a relatively simple question and should be easily answered. But the significant question is not how old you are physically but how old you are mentally or intellectually. The individual's intellectual age and interest is reflected in his daily actions. What do you read first when you pick up the daily paper? Do you read the financial section? How long has it been since you read the editorials? Do you read the published literature in your field?

The relative youth of cost accounting should keep us youthful in thought and action. Without mental growth, i.e., the continued progress characteristic of youth, judgement will lose clarity and older individuals can become road blocks to progress. Further, how old are you in relation to change—in your immediate circle, those reflecting general progress in industry, and changes in responsibility? Our ability to give change an exhaustive review determines our intellectual age.

The second question we are asked to answer is what did you major in? Some individuals major in gossip and rumors manufactured on the coffee break, some major in office politics and forecasting organization changes. The answer to what you majored in becomes somewhat difficult to offer in industrial accounting, partly because of the following:

1. In most instances, the accountant has a working knowledge of general accounting when he leaves school. However, his knowledge of industrial accounting requirements in general is insufficient. This lack of skill results in some limited assignments to routine tasks.
2. The great effort to mechanize industrial accounting has changed many assignments from a desk to a machine. The need for increased control work and better systems in mechanization is a natural assignment for graduate accountants. To fill these assignments effectively, the individual must recognize conditions and fit himself into the pattern which they are forming.

The job before each of us is to learn to like our work and to perform it with enthusiasm. How often have you known an accountant who changed jobs because he did not like it and then took a similar one at a disadvantage? How often have you known the accountant who has more than enough to keep him busy and who is the happiest man in the plant? Accountants might well demonstrate what they have majored in by more dedicated attention to their task.

The third question we are all asked to answer is, What are you worth? Most everyone will recall how very difficult this question is to answer on an employment application. The question is equally hard to answer when you give consideration to what am I worth to the company which now employs me, what am I worth to the community in which I live and what am I worth to the family which depends on me? What are the assets? How can they be enlarged? What are the liabilities? How can they be kept under control?

This question can never be answered glibly because what you are worth depends on—1. Your personal attitude toward accomplishment and progress. 2. How much you have absorbed from the generation that preceded you.

Industrial accountants might well think about what they are worth in terms of what they are accomplishing or can accomplish and not in terms of what they think they must have. Accomplishment is a personal thing which can be personally measured with as much accuracy as the usual dollars and cents.

J. E. LAMB

# Notes on Current Reading

## Books

### Direct Costing

*Austin Donnelly, Butterworth & Co., (Australia) Ltd., by Halstead Press Pty. Ltd., 9-19 Nickson Street, Sydney, 1956, 174 pp.*

Need for "book-length" treatment of direct costing spurred the authorship of this volume which is balanced in its approach, considering first the nature and meaning of direct costing and then entering upon techniques, uses, advantages and disadvantages. The relationship of direct costing to managerial decisions, pricing, cost control and profit measurement are among the topics discussed.

### How the Smaller Business Utilizes Internal Auditing Functions

*Institute of Internal Auditors, 120 Wall St., N. Y., 1957, 60 pp., $1.00.*

Among the internal auditing services identified in this "Research Committee Report No. 3," are audit of cash, accounts receivable, inventories, securities, sales, other income, payrolls, operating reports, cost accounting, stores reports, and tax returns. Much of the initial portion of the text is devoted to the appearance, growth and appropriate conduct of the internal auditing function in a business. These follow six case descriptions of internal auditing services.

### Fluctuations, Growth, and Forecasting

*Sherman J. Maisel, John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y., 1957, 332 pp., $7.50.*

Central to this text on a topic of much current interest (an interest which shows signs of becoming permanent) is a group of "studies in spending decisions". Attention throughout is on the use of the results of forecasting for the making of decisions. "Dynamic policies in the international sphere . . . for business, and for individuals" are considered in the final chapters.

### Office Management

*Charles B. Hicks & Irene Place, Allyn and Bacon, Inc., 70 Fifth Avenue, New York 11, N. Y., 1956, 548 pp., $8.65.*

Comprehensively done, this new book in a both old and new field does not neglect either work controls or work simplification, nor does it by-pass the central topic of personnel selection and supervision. Not surprisingly, the final chapter, perhaps climactically, deals in part with mechanizations and steps sometimes designated as automation.

### Modern Mill Controls in the Management of Production, Quality, Waste and Maintenance

*Norbert Lloyd Enrick, Modern Textiles Magazine and Rayon Publ. Corporation, 303 Fifth Avenue, New York 16, N. Y., 1956, paper bound, 28 pp., $2.*

Mill organization and desired controls are shown schematically in charts in the first two chapters of this pamphlet (large-size page format). Control is envisioned in terms of a control laboratory, i.e., largely in engineering terms and eventuating in quality control. However, waste and maintenance control are also treated.

### Everyday Tax Planning to Increase the Family's Spendable Income

*The Journal of Taxation, Inc., 47 East 88th St., New York 22, N. Y., 1956, paper bound, 144 pp., $2.95.*

On the personal side of income taxation, this analysis, subtitled "Practitioner's Guide to Current Tax Problems No. 2, deals with such matters as "investments with special tax appeal", tax benefits of gifts to foundations and to minors, family partnerships, short-term trusts, etc.

## SELECTED ARTICLES FROM ACCOUNTING PERIODICALS

THE ACCOUNTING REVIEW, *April,* 1957 (College of Commerce and Administration, c/o Carson Cox, Ohio State University, Columbus 10, Ohio, single copy $1.50)

Income Taxes in Financial Statements. Maurice Moonitz.
Some Comments on the Applicability of Direct Costing to Decision Making. Morton F. Moss and Wilber C. Haseman.
Precise Criteria Needed in Evaluating Accounting Alternatives. Kenneth G. Young.
Detail for a Blueprint. R. J. Chambers.
The Theory and Practice of Accounting. H. McCredie.
Automation in Accounting Systems. Arthur E. Carlson.
Cost Concepts for Control. Robert N. Anthony.
Towards a New Accounting. Bert Schireson.
Division of Retained Earnings to Reflect Business Needs. Harry G. Brown.
Macroaccounting and Some of Its Basic Problems. S. C. Yu.
Accounting Research. Sidney Davidson.

CANADIAN CHARTERED ACCOUNTANT, *April,* 1957 (Chartered Accountants Bldg., 69 Bloor St. East, Toronto 5, Ontario, Canada, single copy $.50)

Cash Forecasting. A. R. D. Campbell.
Accounting for Plant Shutdowns. Harry M. Belyea.

THE CONTROLLER, *April,* 1957 (2 Park Ave., New York 16, N. Y., single copy $.50)

Cost Control in the Paint Industry. C. G. Davison.
History of Corporations. Stephen H. Fletcher.
Systems Planning for Computer Application. Howard S. Levin.
The Future of the Programmer. Dudley E. Browne.

COST AND MANAGEMENT, *March,* 1957 (31 Walnut St. So., Hamilton, Ontario, Canada, single copy $.50)

Productivity, How to Be Realistic in Its Measurement and Its Improvement. Allen W. Rucker.
Decentralized Profit Planning and Control. W. E. Gordon.
Costing for Decision Making. Leonard A. Cohn.

THE FEDERAL ACCOUNTANT, *December,* 1957 (P. O. Box 53, Washington 4, D. C.)

Fundamental Concepts for Rates and Rate Structures for Reimbursable Federal Projects and Programs. E. Reece Harrill.
Defense Procurement in a Peacetime Economy. Wallace E. Woodbury.

ILLINOIS CERTIFIED PUBLIC ACCOUNTANT, *Spring,* 1957 (208 South La Salle St., Chicago 4, Illinois, single copy $.40)

Electronics—A Challenge to Auditors. Robert G. Wright.
Accounting Problems in the Oil and Gas Industry. B. S. Mothershead.

JOURNAL OF ACCOUNTANCY, *April,* 1957 (270 Madison Ave., New York 16, N. Y., single copy $.75)

Allocation of Income Taxes. Hans J. Shield.
Business Combinations: An Alternate View. George O. May.

JOURNAL OF MACHINE ACCOUNTING, *April,* 1957 (6109 N. Karlov, Chicago 30, Illinois)

Getting Acceptance on Computer Processed Results. H. N. Laden.

NEW YORK CERTIFIED PUBLIC ACCOUNTANT, *April,* 1957 (677 Fifth Avenue, New York 22, N. Y., single copy $.50)

Accounting at the SEC. Louis H. Rappaport.

# For Your Information

## BETTER ACCOUNTING IN THE FEDERAL GOVERNMENT

THE JOINT PROGRAM to Improve Accounting in the Federal Government was started in 1948 and the developments under it has been reflected in annual progress reports since that date. The eighth of these reports, concerning itself with developments in 1956, was issued earlier this year. The following are excerpts from the release which accompanied its issuance:

"This brief summary of the 1956 progress report under the Joint Program to Improve Accounting in the Federal government can include only a few of the many illustrations contained in the report. The items are selected to indicate the more important general developments and several types of identifiable savings. Savings which resulted from management use of better financial data are not selected unless they were specifically measured.

### General Developments

"General developments include representative activities in which the three central agencies (General Accounting Office, Budget Bureau and the Treasury) furnished joint leadership in the Government-wide aspects of the improvement program, and other matters of Government-wide applicability and significance.

"Public Law 863 and other financial management legislation was enacted in 1956 to carry out recommendations of the Hoover Commission for the modernization of the budgeting and accounting practices of the Government. Internal organizational changes and strengthening of the Bureau of the Budget provided more active leadership within the executive branch in the development of needed improvements in the agencies. A program has been started to develop a time-phased plan in each executive agency for the installation and maintenance of better financial management practices.

"The central accounts and certain reports of the Government were expanded to include cash assets and related liabilities for such items as bank balances which Government corporations maintain in commercial banks, deposits in transit, imprest and cashier funds, outstainding checks, etc. in order to provide more complete information on the Government's cash operations.

"The 1958 Budget Document, prepared in 1956, contains cost-based budgets for 46 appropriations, an increase of 42 over the previous year. Such budgets are based on accrual accounting systems used by the agencies. In addition, cost information developed from agency accrual accounting systems was submitted to the Bureau of the Budget in justifying the budgets for another 13 appropriation requests. Efforts toward the development of common classifications for programming, budgeting, accounting and reporting have resulted in improvements in the appropriation and activity structure of 36 independent agencies and constituent units of departments in the 1958 budget.

"The extension of the Joint Program to European operations developed improved methods which resulted in utilization by the United States Army in Europe, in the first two months, of property valued at more than $1,000,000 which had previously been classified as excess material to be disposed of. Later information has been received that the army has recovered approximately $15 million of such material for use through October 31, 1956. Simplification of

inventory pricing methods by United States Air Forces in Europe will result in savings in excess of one man-year per overseas air base.

"The rapidly expanding use of electronic equipment and methods in office automation has highlighted the need for a comprehensive inventory of such equipment in use or planned for use in the Government and its application. This survey was started by the General Accounting Office late in 1956.

### Examples of Savings

"The evolutionary nature of improvements in financial management systmes and techniques produces long-range benefits which cannot always be expressed in terms of direct and specific dollar savings. However, examples of substantial savings due to simplifications and improvements during 1956 are recognizable in some of the accomplishments reported by the agencies. Many of these are of recurring significance. Among these identifiable savings are:

1. "A substantial number of cases, involving a large volume of documents, which previously were sent to the General Accounting Office for settlement as claims will be settled directly by the agencies under Public Law 798 enacted in 1956. As a result, the General Accounting Office estimates it will eventually save $600,000 a year by releasing or reassigning personnel to more important work.
2. "The first year's experience with Government purchase of blanket, position schedule, or other types of surety bonds on employees reflects annual savings to the Government at the rate of $100,000 a year with an increase of more than 50 per cent in the amount of indemnity protection. At the same time, the employees (who were previously required to pay for and furnish individual surety bonds) saved $1,700,000 a year.
3. "As the result of an intensive utilization survey in Farmers Home Administration, 2,500 items of nonexpendable property, with an inventory value of $62,500, have been released and 1,800 items have been set aside for planned reserve.
4. "Department of the Army saved $1,500,000 through improved management and related accounting and cost control systems at locations financed by industrial funds.
5. "The Department of the Navy also reported savings of about $1,500,000 at similar Navy locations. Revisions of Navy military pay procedures reduced exceptions by the General Accounting Office by about $800,000 in 1956. Improvements in financial management practices resulting from the Navy internal audit program (including contract audits) resulted in procurement savings of $166.4 million; $50,000 in the elimination of nonessential positions and $400,000 in the elimination of duplicate and unnecessary records; $25,000 in the discontinuance of a superfluous officers' mess; and a reduction of $2.8 million in the stock fund of one activity.
6. "During the first eighteen months of operation of the General Supplies Division of the Air Force stock fund, inventories were reduced by more than $32 million.
7. "Improvements in the accounting operations of the Office of the Secretary, Department of Health, Education and Welfare, resulted in recurring annual savings of $17,000.
8. "An improved procedure for certifying earnings for disability claims in the Bureau of Old-Age and Survivors Insurance will save $62,000 annually.
9. "Immediate savings of $147,000 resulted from improved procedures relating to 8,000,000 accounts of the Bureau of Old-Age and Survivors Insurance with individuals to which there is infrequent reference, and annual recurring savings of $28,000 are estimated.
10. "Annual savings of $93,000 are estimated from other procedural improvements in the Bureau of Old-Age and Survivors Insurance.
11. "Improvements in the methods of operation of the Passport Office resulted in annual savings of about $150,000.
12. "Improved check preparation processes in the Division of Disbursement, Treasury Department, resulted in savings in excess of $100,000 during 1956 and annual savings of about $25,000 are estimated to result from improvements in accounting for transactions of disbursing officers in foreign areas."